Preventing opioid overdoses in Europe

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Preventing opioid overdoses in Europe: A critical assessment of known risk factors and preventative measures

Final report

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Introductory note

This report is the outcome of a project into opioid overdoses. The remit was to focus on finding practical methods of overdose prevention. In order to fulfil this remit, a critical review of existing knowledge on overdose prevention was conducted. The report adds value to existing information by developing a methodology to classify and analyse risk and protective factors stratified by those involved (drug users, observers and organisations). The report then assesses the extent to which risk and protective factors can be potentially modified at different levels, e.g. individual, treatment setting, organisational and strategic. The report therefore has the potential to be updated as new information emerges.

As a result of the review, we have attempted to draw out practical measures and interventions that could reduce the likelihood of overdose being fatal, especially within the European context. In addition, we had the opportunity to filter the findings of the review through a Scottish expert group. The group included a wide range of professional groups who had day-to-day frontline experience of managing drug misusers and overdose.

There are limitations which should be noted. This was not a comprehensive or systematic review (these may be found elsewhere). The studies we considered took place in relatively few countries, e.g. UK, Australia, North America. The expert group was ad-hoc and geographically specific; other groups might have come to different conclusions.

The views expressed in the report are those of the authors and do not necessarily reflect those of the EMCDDA.

Summary

Introduction

The objective of this report is to review the literature on preventable risks of fatal overdose in heroin users. To the extent that such factors can be identified, prevention and treatment interventions for potentially fatal overdoses can be informed by research findings. Extant reports already make a range of recommendations regarding overdose with one review stating that 'most overdoses and deaths are avoidable'. However, what 'avoidable' means in this context is unclear. Broadly speaking, the current state of knowledge is that the more individual, situational and organisational risk factors that are present, the greater the likelihood that the overdose will be fatal. The degree to which this complex set of factors can be modified in order to reduce fatal overdose is the focus of this report.

Method

There were four steps. 1. Key reviews were identified (see Appendix 1). 2. Using these reviews, the aim was to identify risk/protective factors associated with non-fatal and fatal overdoses. 3. The analysis focused on assessing the impact of non-fatal overdoses on subsequent overdose experience and differentiating fatal and non-fatal opiate overdoses. 4. The information was reviewed by an expert panel at St Andrews University, Scotland in April 2010.The panel considered the efficacy and feasibility of sixteen measures identified by the review.

Key results

The single most important factor for fatal overdose appears to be using other depressant drugs at the same time as illicit opiates. It has previously been suggested that some multifaceted combination of treatment options, e.g. increasing and improving treatment with opiate substitutes, community peer education, family support groups, supervised injecting facilities, and making naloxone available at home may be needed to have any practical effect on mortality from overdose. However, the review identified barriers at several levels; firstly, for drug users themselves, secondly for witnesses, thirdly for service providers and fourthly for society. These barriers need to be overcome in order to reduce overdose. Ultimately, without behavioural change on the part of drug users, there is unlikely to be a significant reduction in the level of fatal overdose. The expert panel also highlighted the fact that overdose is often a symptom of deeper underlying problems in the individual that initiate and exacerbate problematic drug use. Without addressing these problems (e.g. psychiatric conditions, combinations of depressant drugs), the impact of primary overdose prevention may be limited. The panel felt that practical interventions could occur in settings not identified in the literature, for example, when drug users are in police custody. However, there is no current evidence that such interventions do actually reduce fatal overdose.

In summary, there are many reasons for fatal overdoses and the review did not identify any particular measure that is likely to have a significant impact. Rather there is evidence that many interventions may reduce overdose, particularly in settings where the drug user is in contact with treatment or emergency services. However, it is important to bear in mind the distinction between overdose prevention at the clinical and at the population level. At the clinical level, specific interventions are available and have been shown to be effective (e.g. pharmacological treatment). At the population level, where many drug users are not in contact with services, overdose reduction depends on behavioural change by drug users themselves (e.g. avoiding the mixture of opiates and other depressant drugs). Overdose

prevention is a multifaceted problem. Purely technological interventions were thought likely to have a relatively limited impact. Rather, overdose involves personal and societal issues; only when these are addressed is the level of fatal overdose in Europe likely to decrease.

Review of preventable risks of fatal overdose in heroin users

1. Introduction

There have been several reviews on the nature and extent of drug overdoses (Best et al., 2000; 2001; Rome et al., 2008). These reviews have also sought to identify preventive measures that could reduce overdoses. A key issue that has been addressed is the nature and extent of factors that differentiate between non-fatal and fatal overdoses. To the extent that such factors can be identified, prevention and treatment of potentially fatal overdoses can be informed by research findings.

Reviews have focused on four sets of factors. The first set deals with the characteristics of the drug users themselves. The second deals with the circumstances in which the overdose occurred. The third deals with treatment interventions. The fourth deals with organisational response in the aftermath of an overdose.

The reviews make it clear that there are many interacting factors that determine whether or not an overdose will be non-fatal or fatal. While there are parameters associated with both non-fatal and fatal overdoses, for practical purposes interventions are focused on (a) overdose prevention (including opportunities for treatment) and (b) responses to overdose that have occurred.

Some responses are obvious, for example, if an overdose has occurred ensuring that bystanders take measures on the spot in terms of getting expert help. This might sound 'obvious', but there are barriers, e.g. knowledge of appropriate responses, fear of calling emergency services, bystanders' own state of intoxication. These factors highlight an important aspect of overdose that is sometimes forgotten or not acknowledged, namely that the act of drug taking is an event with its own set of rules. While the majority of drugs users engage in harm reduction in relation to HIV infection, it is unclear whether they are also willing to do so in relation to overdose. An important factor is the trade-off being the specific harm reduction measure and the ('cost') and the anticipated benefit. In relation to HIV infection, there is little cost in using clean injecting equipment (e.g. avoid sharing drugs), whereas the perceived cost of harm reduction measures, e.g. not mixing drugs, continuing high levels of drug use, for overdose may be higher. While there is evidence that drug users have engaged in some harm reduction in relation to overdose, it is difficult to quantify what effect this has had on reducing fatal overdoses.

Extant reports already make a range of recommendations regarding overdose. However, the circumstances (individual, social and cultural) often mean that recommendations cannot be implemented or are not relevant in certain settings.

One issue is whether overdose prevention should be equated with, say, heart attack prevention, where it is assumed that a 'rational' person would want to reduce the risk by taking appropriate measures. Many people who overdose have already done so on previous occasions. Thus, in some instances, previous overdoses do not appear to prevent further risky use.

Another issue is the setting and circumstances of overdose studies. How legitimate is it to extrapolate general conclusions from a study of overdose in one setting to different settings? Once again, a parallel with heart attack is useful. It is considered scientifically

valid, for example, to compare the results of different studies that have examined the role of aspirin in reducing heart attack. These studies are carefully controlled. In contrast, it is rarely possible to conduct controlled studies of overdose, which are primarily observational in nature. An exception is the current NALoxone InVEstigation (N-ALIVE) Pilot Randomised Controlled Trial (RCT). The hypothesis of the main trial is that giving naloxone on release to prisoners with a history of heroin use by injection will reduce heroin overdose deaths in this population by 28 % in the first 12 weeks after release. Factors that appear to be important in one study of overdose, say in Australia, may have different relevance in other countries, where drug use patterns and responses to overdose may be very different. This may be partly due to cultural factors and partly due to differences in study design, populations and outcomes.

It is important to bear in mind that every drug-taking event involves a complex set of factors, including:

- Which drug or combinations of illicit, licit and prescription drugs were taken and by what route of administration?
- How much? How frequently? How pure was the drug?
- What was the person's tolerance?
- Had the person recently been released from prison?
- Where did the overdose take place?
- Did the person have a history of psychiatric problems?
- Did the person have physical health problems?
- Had the person engaged with drug treatment and if so what were the outcomes?
- Use of other depressant drugs at the same time (alcohol and benzodiazepines are the major drugs)
- Age/duration of drug use
- Gender

When a drug overdose occurs, it is as a consequence of one or more of these (and perhaps other) factors. There is a spectrum along which overdoses lie, ranging from not feeling well through to fatality. It has already been noted that:

> 'although there are clearly individual risk factors…and situational risks our ability to categorise and predict fatality remains poor' (Petersen & Best, 2005).

> 'While significant risk factors for opioid overdose fatality are well recognised, the mechanism of fatal overdose remains unclear' (Warner-Smith et al., 2001).

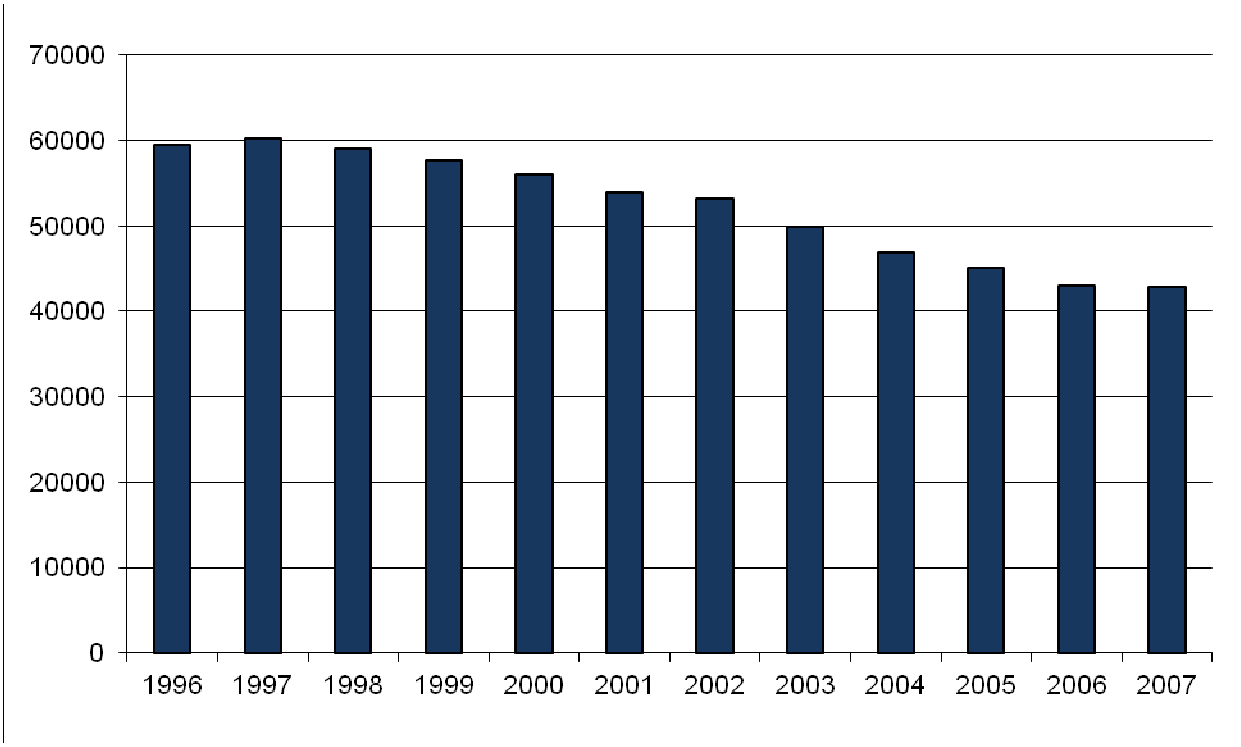
Thus, the severity of the overdose can only be predicted in probabilistic terms. Broadly speaking, the current state of knowledge is that the more individual, situational and organisational risk factors that are present, the greater the likelihood that the overdose will be fatal. A parallel may be drawn with road traffic accidents (RTAs) whereby multiple methods (see Table 1) have resulted in reduction in the rate of RTAs (Charlton and Smith, 2003).

Table 1. Measure to reduce road traffic accidents (RTAs)

1. Use seat belts.
2. Enforcement of speed limits.
3. Prohibition of alcohol in excess of legal use while driving.
4. Prompt medical attention when an RTA occurs.
5. Put speed bumps along intersections. Drivers will be forced to reduce speed rather than speed up to beat a changing stoplight. Speeding through intersections and running red lights are among the biggest cause of traffic accidents.
6. Zebra crossings should be provided for pedestrians for safe road crossings at appropriate places.
7. Signals for road crossings at important busy places where a large number of people have to cross the road everyday.
8. Road Safety Day/Road Safety Week in schools.

Figure 1 shows that the number of people killed in road accidents in Europe has been gradually declining since 1996.

Figure 1. People killed in road accidents (European Union, 27 countries)



Source: http://epp.eurostat.ec.europa.eu.

The key issue for this report is whether an analogous set of preventive measures for overdose can be identified and evaluated.

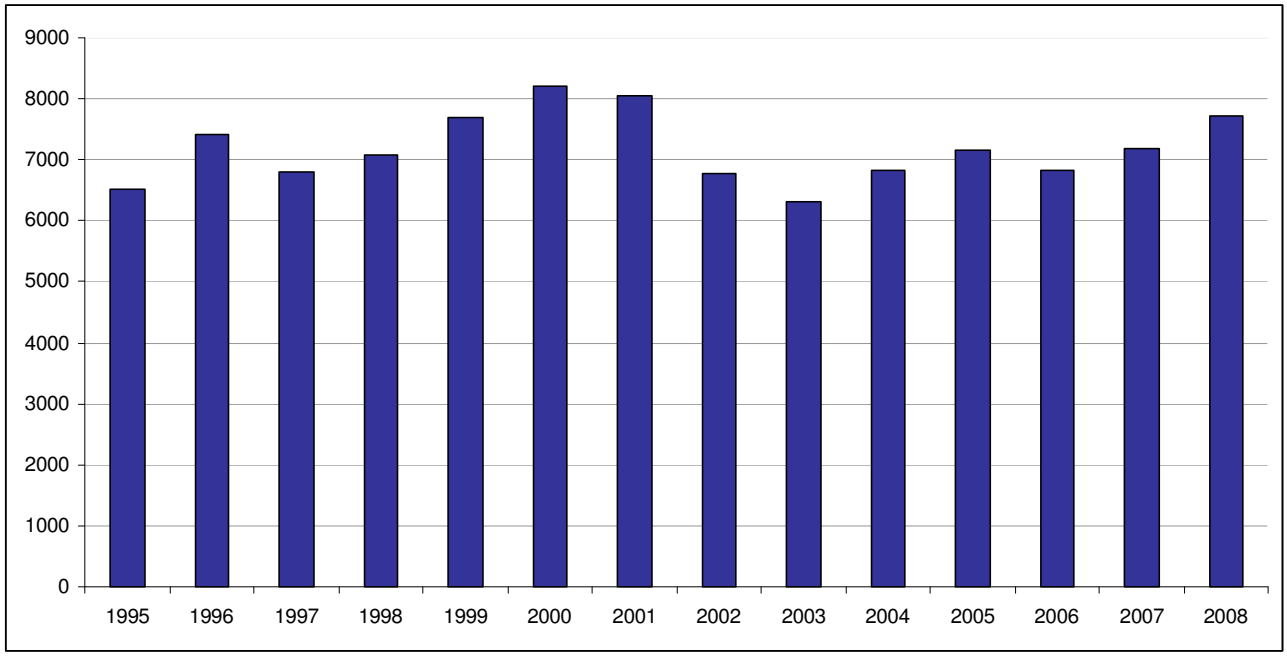
1.1 Policy relevance

Drug-related deaths are a major cause of mortality in Europe, particularly among people aged 15–49. One study found that 10 % and 23 % in this age group could be attributed to opioid use (Bargagli et al., 2005). During the period 1990–2006, between 6 400 and 8 500 drug-induced deaths were reported each year by EU Member States, Croatia, Norway and Turkey, adding up to more than 135 000 deaths. In 2006, the United Kingdom and Germany accounted for half of all reported deaths (EMCDDA, 2009). There appears to be a paradox in that levels of injecting drug use have been decreasing while the number of drug users in contact with treatment services has been increasing. The EMCDDA has considered a range of factors, including an ageing population becoming more vulnerable; increased levels of polydrug use; a failure of existing services to target or reach those most vulnerable; or even an increase in the numbers of relapsing opioid users leaving prison or treatment, who are known to be at particularly high risk (EMCDDA, 2009).

Figures on drug-related deaths are difficult to interpret (EMCDDA, 2009b). Figure 2 shows the fluctuating trends in drug related deaths. Thus, it is difficult to establish whether preventative measures have had any impact. Between 2000 and 2003, most EU Member States reported a decrease followed by a subsequent increase in deaths between 2003 and 2008. Preliminary data available for 2009 suggest an overall figure equal to or slightly below that for 2008 (EMCDDA, 2011a, Vicente, 2010). The reasons for the sustained numbers of reported drug-induced deaths are difficult to explain, especially given the indications of decreases in injecting drug use and increases in the numbers of opioid users in contact with treatment and harm reduction services. Against this possible reduction in drug use in the at-risk population, stable or rising numbers of drug-induced deaths have become a major cause of concern.

A number of mortality cohort studies are currently underway in Europe (EMCDDA, 2011b, Giraudon, 2011). This type of study can determine overall and cause-specific mortality rates for the cohort, and can estimate the group's excess mortality compared to the general population. Large-scale longitudinal cohort studies can be used to test hypotheses, for example, about the reasons for changes in the numbers of drug-induced deaths, as well as to monitor the overall risk and detect changing patterns in the causes of death. Unfortunately, some countries show a low detection rate of overdose in the general mortality registries and, therefore, a significant proportion of deaths recorded with an 'unknown' or an insufficiently specified cause (e.g. cardiac arrest) might be overdoses (EMCDDA, 2009).

Figure 2. Number of 'drug-induced deaths' recorded in EU Member States according to national definitions



Source: http://www.emcdda.europa.eu/stats11/drdtab2e

1.2 Scope of the review

It was agreed that this would be a descriptive process, whereby the existing reviews would be synthesised and gaps in the literature identified. As a result of this process, recommendations for practice and policy might be outlined. It is, however, beyond the scope of this review to critically appraise all the individual studies on overdose. Furthermore, the review does not detail the complexities of factors in different countries that might operate to prevent or increase fatal overdose (such as the legal framework, accessibility to services, professional attitudes, resources and demands, quality of services, the demographics of the population, availability of different drugs).

The project objectives were to:

1. Undertake a review of the literature. This is based on the references listed in section 6 (Appendix 1).
2. Focus (where information is available) on the following key areas:

a. Poly-substance misuse and injection;
b. Comorbid disorders including suicide, mental and physical health;
c. Care pathways including treatment (e.g. prescribing, interactions between illicit drugs and prescribed medications, methadone) and service models (e.g. detoxification, substitution, drop-outs);
d. Special groups, e.g. adolescents, prisoners (in particular, after prison release), pregnant drug users, and older people.

3. Focus on both fatal and non-fatal opiate overdoses. The topics covered include (again where information is available):

a. Assessment of impact of non-fatal overdose on subsequent overdose.
b. Differentiate between fatal and non-fatal opiate overdose.
c. Assessment of morbidity/consequences related to non-fatal overdose.

1.3 Method

Key reviews were identified (see Appendix 1). Reviews published from 2000 to 2008 in Europe, Australia and the USA were included. For this project, the aim was to identify risk/protective factors associated with non-fatal and fatal overdoses. With a few exceptions, we did not go back to source papers. Therefore, studies were considered only in terms of the information presented in the reviews. A total of 31 papers were analysed for this report.

For each study, presented in these reviews, the following dimensions were categorised:

1. Prevention and treatment intervention, organisational response or other activities related to overdose.
2. Did the intervention/activity increase or decrease the likelihood of fatal overdose?
3. Study population e.g. treatment settings (e.g. recent prison release, drug injectors).
4. Defined outcome, e.g. non-fatal or fatal overdose.
5. Comments, e.g. clarifying an aspect of the study.
6. Country where the study was conducted.

1.4 Definitions

Overdose

The EMCDDA definition of drug-related deaths (more precisely, drug-induced deaths) includes 'people who die directly due to use of illegal substances, although these often occur in combination with other substances, such as alcohol or psychoactive medicines. These deaths occur generally shortly after the consumption of the substance'. (http://www.emcdda.europa.eu/themes/key-indicators/drd) (EMCDDA, 2010). They are also known as overdoses or poisonings. For the purpose of this review and because evidence of 8/10 reported cases of drug-induced deaths reported to the EMCDDA being related to opiates, mainly heroin, we consider only opiate overdoses. The review does not cover overdoses related only to alcohol, overdoses related only to prescription drugs, or only to non-opioid drugs.

The International Classification of Diseases (ICD) is the international standard diagnostic classification for all general epidemiological and many health management purposes and clinical use (World Health Organization, 1992). http://apps.who.int/classifications/apps/icd/icd10online/). The current edition (ICD-10) classifies overdoses in Chapter XIX: Injury, poisoning and certain other consequences of external causes (S00-T98). It has been noted that, 'the lack of more specific codes in both the ICD-9 and the ICD-10 precludes perfect correspondence between unintentional heroin overdose deaths and a specific code' (Landen et al., 2003).

(Sporer, 1999) discusses the complex clinical issues surrounding drug overdose. In their qualitative study of overdose, (Rome et al., 2008) defined an overdose as 'a situation where after using, you or another person passed out and couldn't wake up'. In essence, overdose may be defined by clinical or self-report criteria.

Safety (or lethal) ratio assuming no tolerance

The safety ratio equals the number of standard or usual doses it takes to reach the median lethal dose (Caulkins & Menefee, 2009). The median lethal dose is the dose required to kill half the members of a tested population, thus, half of a population who consumed six times the average dose of heroin would die. This assumes that the person has not built up tolerance to the drug. The range of safety ratios of abused drugs is wide (Leung, 2007). Table 2 shows some of the safety ratios given by Leung (2007).

Table 2. Safety ratio of drugs (assuming no build-up of tolerance)

Drug	principleactive component	usual lethal concentration in blood (mg/l)	usual lethal dose	usual effective dose	safetyratio
Alcohol*	Ethanol	3600	330g	33g	10
Cocaine	cocaine hydrochloride	5	1200mg	80mg	15
Codeine	codeine phosphate	2.3	800mg	40mg	20
GHB	gammahydroxy-butyrate	300	16g	2g	8
Heroin	Diacetymorphine	0.3	50mg	8mg	6
Ketamine**	Ketamine hydrochloride		2.7g	70mg	38(?)
LSD	d-Lysergic acid diethylamine	4.8ug/L	100mg	100ug	1000
Marijuana	?9-tetra-hydrocannibinol		>15g	15mg	>1000
MDMA***	MDMA	3	2g	125mg	16
Methadone****	Di-methadone hydrochloride	0.7	100mg	5mg	20
Methamphetamine*****	Methamphetamine	2(?)	>150mg	15mg	10
Rohypnol	Flunitrazepam	0.06	30mg	1mg	30

* Ethanol most common substance in multidrug fatalities

** Reported deaths only IV, IM or with co-intoxicant

*** MDMA - variability linked to environmental factors

**** Methadone - Long half-life a risk factor

***** Methamphetamine - widely divergent reactions to high doses

Source: Leung (2007).

Table 2 shows that heroin has the lowest safety ratio. This means that a person with normal tolerance would have to take only six times the usual 'effective' dose to have a 50 % chance of fatality.

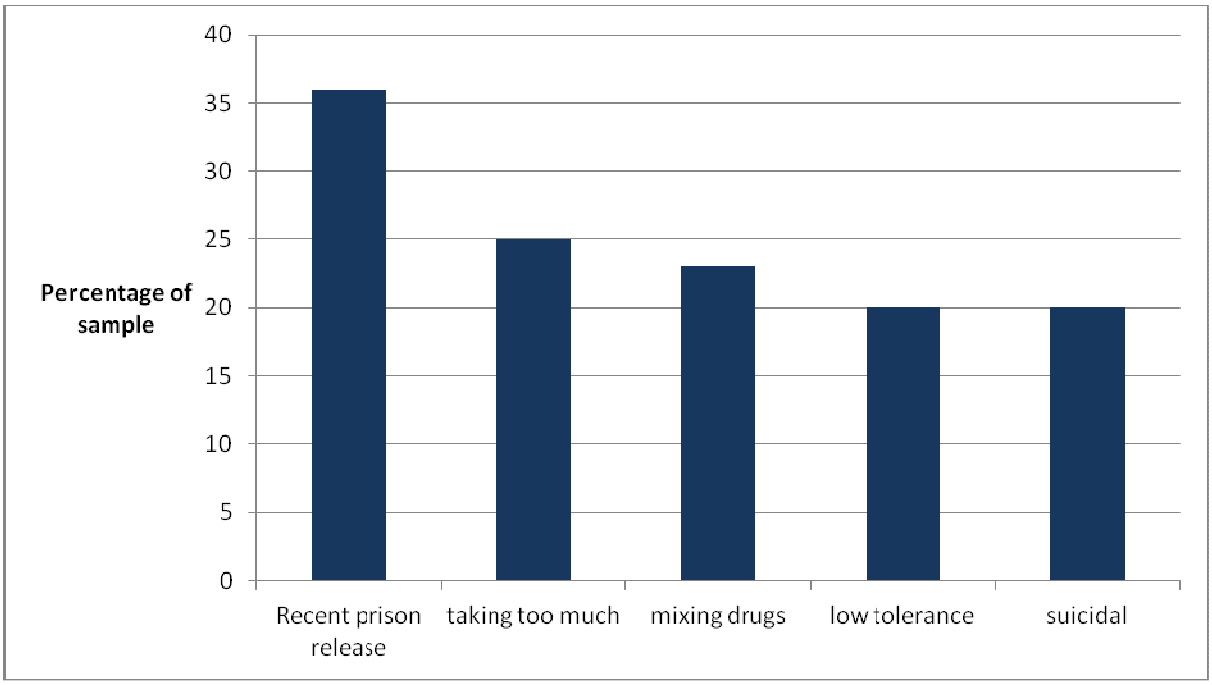
To put the information about overdose in perspective, the following key points were extracted from the literature review. However, many of these facts may be context-specific and not generalisable to other settings; also, some of these points are the cited authors' interpretation of their findings.

1.5 Drug users

- About 2 % of people who inject heroin die each year, which is six to 20 times the rate expected in peer controls who do not use drugs (Sporer, 2003).
- In persons who regularly inject heroin, half of these deaths are attributable to overdose (Sporer, 2003).
- On average, heroin users who overdose report having experienced three overdoses, (mean 3.26, range 1–20) (Rome et al., 2008).
- Most experience overdose only once every few years, but a minority do so far more often (Best et al., 2000) but see also (Rome et al., 2008).
- 'Experience of overdose is neither a deterrent to future drug use nor a motivator for seeking treatment' (Zador, 2005, p. 7).
- Most users believed that the main reason for overdose was the quantity or strength of the heroin (McGregor et al., 1998).
- Few deaths occur 'instantaneously' (Sporer, 1999) but see (Lenton & Hargreaves, 2000).
- Instant death occurs in approximately 15 % of overdose cases (Lenton & Hargreaves, 2000).
- Epidemiology of non-fatal overdoses is quite similar to that of fatal overdoses (Sporer, 2003).
- 41 % of morphine positive deaths had morphine values below the 'fatal' level of 0.15 mg/L and 29 % of methadone-positive deaths had methadone values below the 'fatal' level of 0.2 mg/L (Zador, 2005).
- Of the 77 resuscitated heroin users in two Scottish accident and emergency departments, suicidal thoughts or feelings before overdosing was the underlying reason for the overdose in 49 % (Neale, 2000).
- Suicide and accidental drug overdose seemed to be less of a dichotomy and more a spectrum of intention (Zador, 2005).
- 80 % of survivors of heroin overdose did not perceive themselves to be at high risk of overdose, despite experiencing one in the previous six months (Darke & Ross, 1997).

Research commissioned by the Scottish Government sought the views of people who had directly or indirectly experienced an opiate overdose (Rome et al., 2008). Just under half of the participants had experienced a personal overdose. Figure 3 shows the top five perceived causes of a personal overdose.

Figure 3. Top five reasons cited for a personal opiate overdose in a qualitative study of 44 Scottish drug users



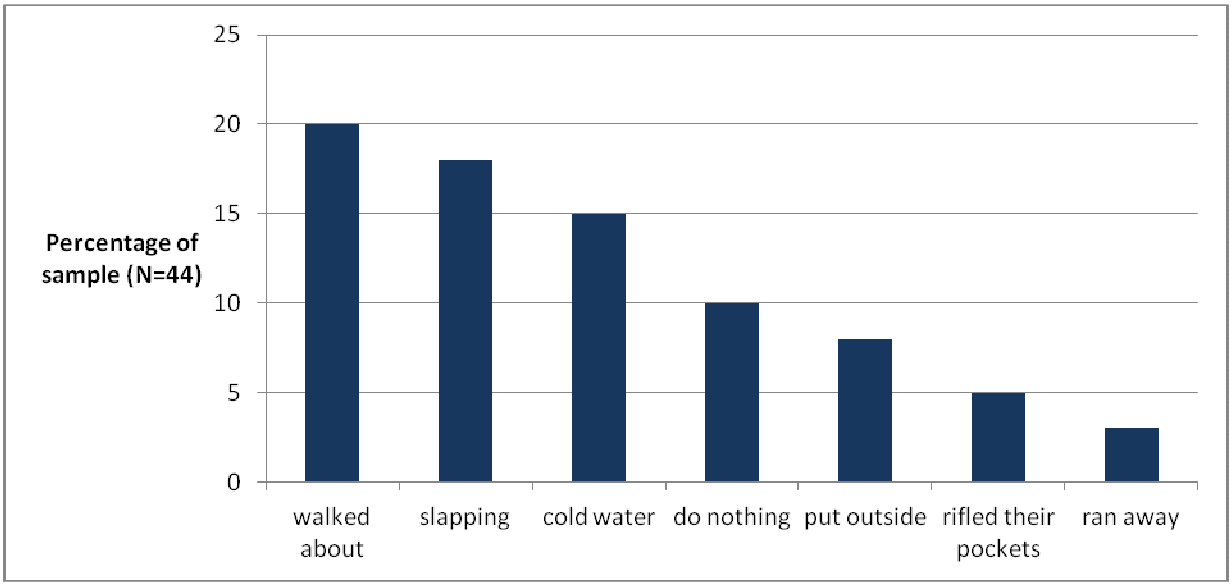
Source: Rome et al., 2008.

1.6 Witnesses and bystanders

- Heroin users who witness an overdose are usually intoxicated themselves (Darke et al., 1996).
- Inflicting physical pain was the most common intervention used by injecting drug users to revive an overdose survivor (Zador, 2005).
- Less than half tried cardiopulmonary resuscitation (CPR) and in most cases death had occurred by the time the ambulance arrived (Zador, 2005).
- In one in four of the cases where there was at least one witness reported as being present, and the death was not reported as instantaneous, a different outcome could have occurred if the witness had acted more swiftly, commenced CPR and called an ambulance at the first sign of trouble (Hickman et al., 2007).
- Approximately 60 % of deaths occur in the company of others (Lenton & Hargreaves, 2000).
- Overdose witnesses only call an ambulance in about 10 % of cases (Rome et al., 2008).

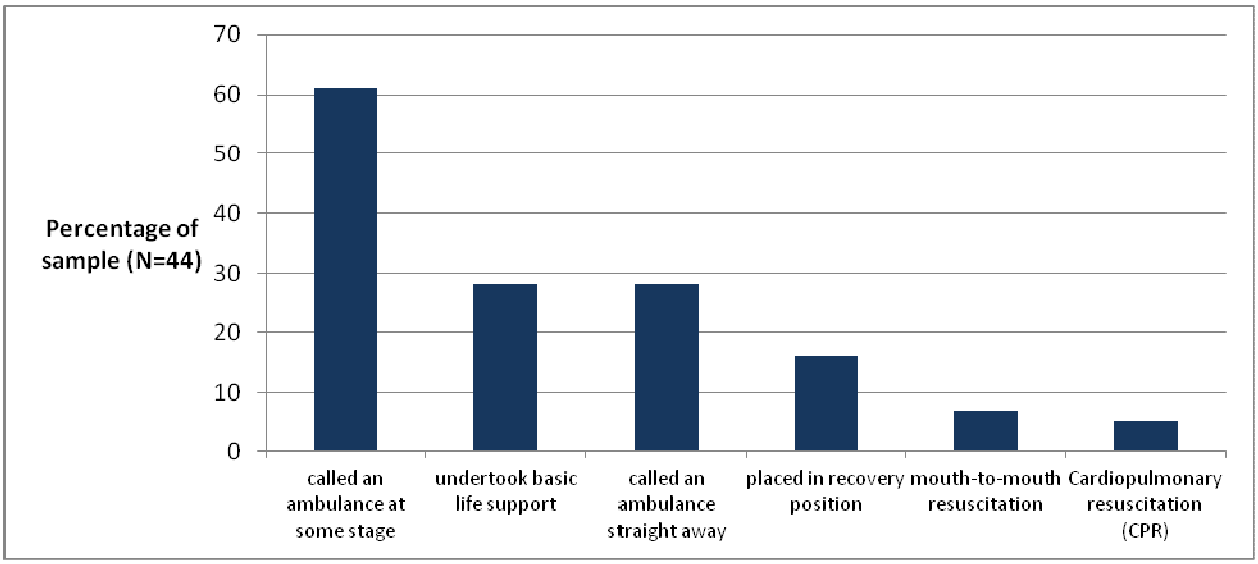
The Scottish Government report (Rome et al., 2008) also interviewed witnesses to an overdose. The report found that a range of interventions, classified by the authors as ‘inappropriate’ and ‘appropriate’ (Figure 5) were taken.

Figure 4 **Inappropriate intervention reported by bystanders witnessing an overdose in a qualitative study of 44 Scottish drug users**



Source: Rome et al., 2008.

Figure 5 **Appropriate intervention of bystanders witnessing an overdose in a qualitative study of 44 Scottish drug users**

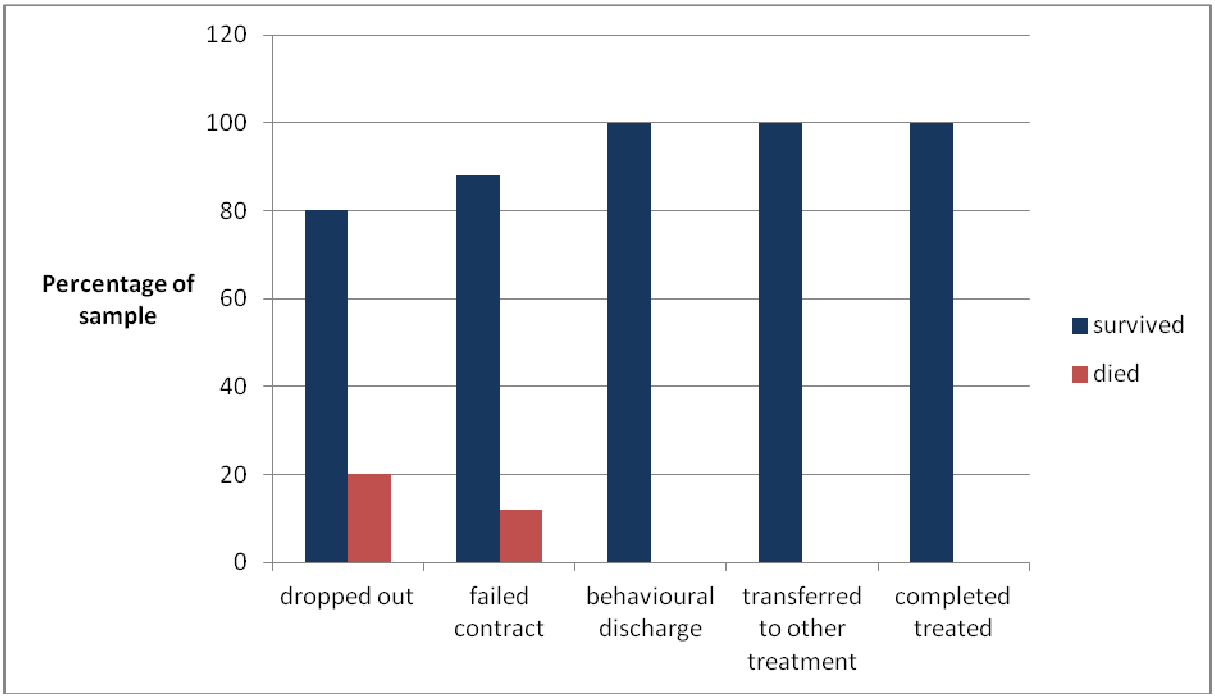


Source: Rome et al., 2008.

1.7 Organisational response to drug users

- Prior to discharge from hospital, overdose patients are not routinely given information about overdose prevention (Rome et al., 2008).
- Case records of people who have died from a drug-related death provide histories of multiple overdoses and hospital attendance prior to death (Zador, 2005).
- Zanis and Woody (1998) undertook a study of one-year mortality rates following methadone treatment discharge and found that death rates, especially overdose, are high among patients who are unfavourably discharged, or who drop out of methadone treatment.
- Bird and Hutchinson, S. (2003) studied the two weeks after release from prison compared to other times of liberty. They found that drug-related mortality was seven times higher in the first two weeks of liberty than at other times. In England, it has been estimated that 15 % of the 1 506 drug overdose deaths in 2005 occurred in people recently released from prison (Department of Health, 2007).

Figure 6. Mortality following methadone treatment — discharge status of 110 patients



Source: Zanis & Woody, 1998.

1.8 Classification of risk factors

The studies described in the reviews were tabulated as described above and the results are shown in Appendix 1. From these tables, lists of risk and protective factors for non-fatal and fatal overdose were drawn up (Tables 3 and 4). It should be noted that the description of the factors is brief and on some occasions, its inclusion as risk or protection may not be obvious. For example, 'immediate overdose onset' is considered to be a protective factor (Best et al., 2001) because rapid overdoses are more likely to result in witnesses intervening.

Table 3. Risk factors classified into three levels: Individual, observers and organisational

Risk factors		
Individual	**Observers**	**Organisational**
Drug use • Topping up on a legitimate methadone prescription • Using someone else's methadone prescription • Preferring illegal drug use in favour of prescribed methadone • Not always taking prescribed medication, which may reduce drug tolerance and increase withdrawals and susceptibility to overdose • Unintentionally taking too many drugs, due to unexpected heroin purity, lower tolerance, or ingesting unknown tablets • More frequent use of illicit methadone • Very high levels of drug intake with users experiencing difficulty in controlling their drug intake • High levels of polydrug use and prescription drug use • Reduced tolerance to opioids • Benzodiazepine use • Large quantities of alcohol • Injecting cocaine • Length of time that people have used drugs • Sporadic use of heroin **Circumstances of overdose** • Slow overdose onset • Two weeks after release from prison (compared to other times of liberty) **Experience of treatment** • Withdrawal from drug treatment • Leaving treatment • Periods of induction and transition, such as when drug users (re)enter or discontinue treatment • Greater number of separate treatment episodes **Psychiatric/physical** • Suicidal ideation • History of mental health problems, a current psychiatric diagnosis and prescription of psychotropic medicines • Access to antidepressants, through genuine prescriptions, obtaining different antidepressants from different prescribers • Feelings of indifference and carelessness • High levels of hepatitis and cirrhosis **Social** • More drug injectors in the social network experiencing conflict with more network members • Life events: recently experienced bereavement of someone close to them, a relationship breakdown, accommodation problems **Circumstances** • Injecting drug use in public places affords less opportunity to test the sample strength	**Consequences of intervening** • Presence of bystanders, e.g. fear of police involvement • Fear of social repercussions	**Treatment** • Unable to access a methadone prescription • Unable to obtain substitute medication • Strict rules (for methadone programmes) increasing the risk of discharge resulting in a high mortality rate • Take-home Naloxone (THN) • Methadone dose is increased too quickly, or initial dose is too high • Poor treatment response • Increasing use of multiple doctors • Excessive increases in psychoactive drug prescriptions **Emergency services** • Changes in police activity, whereby dealing and use at static sites, such as houses, is displaced to street dealing in other areas Prison release • Decreased tolerance

Table 4. Protective factors classified into three levels: individual, observers and organisational

Protective		
Individual	**Observers**	**Organisational**
Circumstances of overdose • Immediate overdose onset • Methadone maintenance — daily dose between 60 mg and 120 mg **Experience of treatment** • Engaged in treatment **Availability of prescribed drugs** • Availability of buprenorphine in treatment settings	**Experience of overdose** • Past witnesses of a fatal overdose • Witnesses had received information on how to prevent overdose/revive a casualty **Reaction to overdose** • Witnesses present at an overdose event are willing to intervene • Witnesses remaining with the casualty • Witnesses who attempted CPR • Public intervened to help overdosed or unconscious drug users **After calling an ambulance** • Ensured still breathing and place person in the recovery position • Cleared space around the unconscious person for the ambulance crew to work on arrival • If in a communal building, limited the number of non-essential persons at the scene • Stayed at the scene to provide essential information to ambulance staff	**Emergency services** • Mapping high risk areas and identifying those repeatedly overdosing • Reducing police attendance at the scene of an overdose and decreasing the risk of arrest • Ensuring that police officers do not routinely attend ambulance call-outs to drug overdoses, unless a death has already occurred • Role of emergency service operators • Emergency units to provide contact and advice cards to known drug users following an overdose **Health services** • Periods of hospitalisation can provide an opportunity for appropriate interventions to be targeted at these high-risk patients • Substance use specialist nurses within the accident and emergency department to progress referral for drug overdose casualties • Increasing the availability of treatment among heroin users, both in the community and in prison • THN (Take-home Naloxone) • Safer injecting rooms (SIRs) **Prison services** • Thorough care for drug users to make the post-release period less of an overdose hotspot

2 Overdose prevention: recommendations, actions and barriers

This section re-organises the material from the literature review into a more accessible form. The Frequently Asked Questions (FAQ) includes topics that the review was mandated to examine.

2.1 What perception do drug injectors have of the risk of overdose?

- Experience of overdose is neither a deterrent to future drug use nor a motivator for seeking treatment (Zador et al., 2005).
- Most users believed that the main reason for overdose was the quantity or strength of the heroin (McGregor et al., 1998).
- 80 % of survivors of heroin overdose did not perceive themselves to be at high risk of overdose (Darke & Ross, 1997).
- When they were asked why they thought they had survived their most recent overdose, by far the most common response (n=25) was that someone else had been present at the time (Zador, 2005).
- There is a notion within the drug-using population that an overdose is an 'occupational hazard' (Independent Working Group on Drug Consumption Rooms, 2006).
- In Scotland, overdose survivors cite recent release from prison as the main risk factor (Rome, 2008).

2.2 What proportion of drug injectors have had a non-fatal overdose?

- Most experience overdose only once every few years, but a minority do so far more often (Best et al., 2000).
- Of active injecting heroin users, 23–33 % had a non-fatal overdose in the past year (Sporer, 2003). This seems to conflict with the findings of Best et al., 2000.
- Approximately half report a history of non-fatal overdose (Kerr et al., 2007).

2.3 What measures do drug injectors take to reduce the risk of overdose?

- Inject with someone present (Zador, 2005).
- Measures suggested by drug users include safer injecting facilities, information videos, legalisation of heroin and resuscitation classes (Zador, 2005).

2.4 What is the drug injectors' experience of witnessing an overdose?

- 43 % have witnessed a heroin overdose in another user within the last year (Sporer, 2003).
- Heroin users who witness an overdose are usually intoxicated themselves (Darke et al., 1996).
- Fatal overdoses were witnessed by 55 of 312 injecting drug misusers — 18 % of the total sample and 33 % of those who had witnessed an overdose (Williamson & Gossop, 1999).
- Fourteen percent of those who had witnessed an overdose in the past year reported that the outcome was death (Davidson et al., 2002).

2.5 What proportion of drug injectors have intervened when witnessing an overdose?

- Inflicting physical pain was the most common intervention used by injecting drug users to revive someone who had overdosed (Zador, 2005).

- Less than half had tried CPR and in most cases death had occurred by the time the ambulance arrived (Zador, 2005).
- Drug users who survive an overdose and go on to witness others having an overdose are less likely to intervene (Tobin et al., 2007).

2.6 What practical recommendations are there for overdose reduction?

- The Scottish review (Rome et al., 2008) made the following recommendations:
  — improve the quality of existing responses to overdose incidents (police and ambulance);
  — improve the assessment of needs;
  — improve and extend current care provision for drug users;
  — information and training for emergency service staff;
  — information and training for drug users and significant others.
- Ways to reduce the damage include increasing access to treatment, developing Naloxone interventions for when overdoses do occur, and offering anti-overdose training to addicts in treatment and out of treatment (Best et al., 2001).
- Some combination of increasing treatment with opiate substitutes, community peer education, family support groups, supervised injecting facilities, and making Naloxone available at home may be needed to have any practical effect on mortality from overdose (Sporer, 2003).
- Interventions that provide drug treatment information and enhance motivation for treatment in the medical setting are recommended, as are policies that reduce barriers to treatment entry among motivated drug users (Pollini et al., 2006).

2.7 What are the main underlying reasons for overdose?

- In 2003 in Scotland, most fatal overdoses (68 % of cases) were accidental, while 13 % were classed as suicides (Zador, 2005).
- Neale (2000) interviewed 77 resuscitated heroin users in two Scottish accident and emergency departments and found that 38 respondents (49 %) reported suicidal thoughts or feelings before overdosing.
- In contrast, deliberate heroin overdose as a method for attempting suicide was reported by only 10 % (Darke & Ross, 2001).
- In another Australian study, a substantial minority (17 %) of the sample indicated that they had ever taken an intentional overdose, and 67 % had had one within the last six months (11 % of the total sample) (Heale et al., 2003).

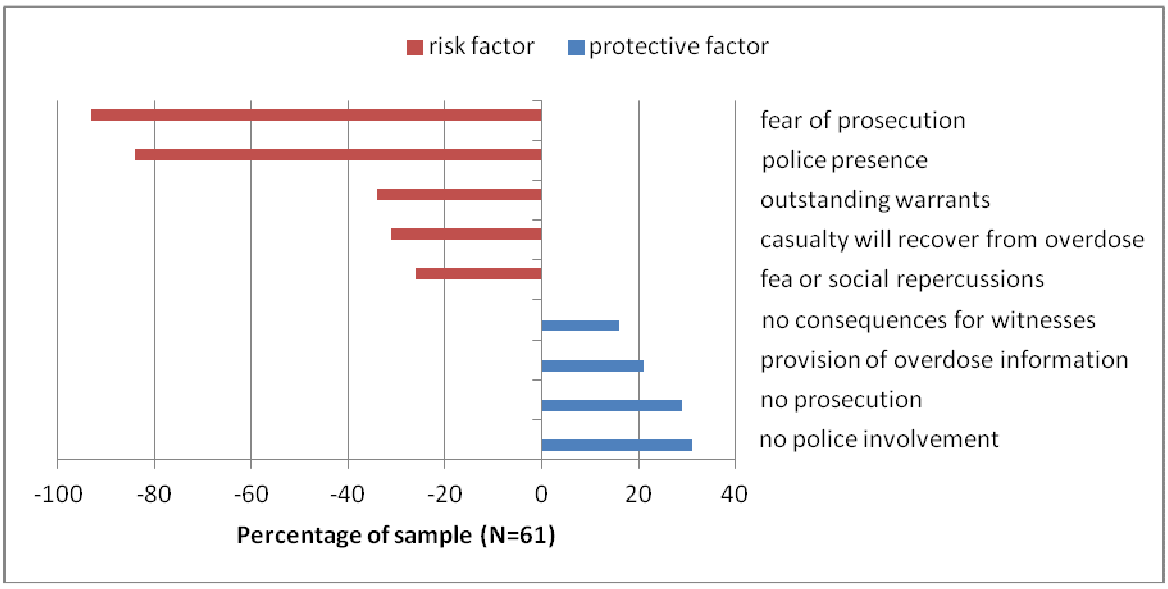
2.8 Why are bystanders both a risk factor and a protective factor?

- Risk factors:
  — inappropriate intervention when witnessing an overdose;
  — bystanders are often users themselves and their own state of consciousness is affected;
  — fear of the repercussions of contacting the emergency services;
  — presence of other bystanders likely to decrease the probability of calling an ambulance;
  — delay in summoning help for fear of possible repercussions, particularly if children are in the house.
- Protective factors:

— witnesses present at an overdose event are willing to intervene, for example, with CPR;
— witnesses are likely to call emergency services.

Figure 7 shows that fear of prosecution prevents 93 % of a sample of drug users from summoning help after witnessing an overdose. However, 31 % would call for help if they felt sure that there was no police involvement.

Figure 7. Factors affecting a bystander's decision to summon emergency services following witness of an overdose in a qualitative study of 61 Scottish drug users



Source: Rome et al., 2008.

2.9 What aspects of polysubstance misuse contribute to fatal overdose?

- Concurrent use of benzodiazepines (Stewart et al., 2002).
- Concurrent use of alcohol, especially heavy drinking (McGregor, C., Darke, S., Ali, R. et al., 1998).
- Longer duration of injecting (Bartu et al., 2004).
- Intermittent injecting (Oliver, P. & Keen, J., 2003).
- Additional psychoactive prescriptions perhaps due to mental health issues (Oyefeso, A., Valmana, A., Clancy, C. et al,. 2000).
- 'Top up' opiate in addition to prescriptions (Neale, J., 2000).

2.10 What aspects of mental health contribute to fatal overdose?

- Suicidal ideation (Stewart et al., 2002).
- Access to antidepressants. (Oyefeso, A., Valmana, A., Clancy, C., et al., 2000).
- History of mental health problems. (Oyefeso, A., Valmana, A., Clancy, C., et al., 2000).
- Feelings of indifference and carelessness. (Rossow, I. & Lauritzen, G., 1999).
- Treatment of mental health issues in different services (Oyefeso, A., Valmana, A., Clancy, C. et al., 2000).

2.11 In what ways do care pathways and service models impact on overdose?

- Seeing multiple doctors is a risk factor (e.g. obtaining different drugs from different doctors).
- Access to prescribed antidepressants (to prevent illicit drug cocktails).
- Supervision and monitoring prescriptions (to prevent drug cocktails).
- Monitoring and assessing additional substance use 'on top' of prescriptions.
- Appropriate arrangements for methadone reduction and/or leaving treatment because of chaotic use.
- Treatment of mental health and physical health in different services.
- Conflict with network of users (is it possible to influence drug user's social networks?).

2.12 What special groups were identified, e.g. adolescents, prisoners (in particular after prison release), pregnant drug users, and older people?

- Homeless drug users (including those with accommodation problems).
- Recently released prisoners (especially at two weeks from prison release).
- The review did not reveal anything about teenagers, pregnant drug users or older people.

2.13 Is it possible to differentiate risk factors (individual, circumstances, and responses) between fatal and non-fatal opiate overdose?

- '…although there are clearly individual risk factors…and situational risks our ability to categorise and predict fatality remains poor' (Petersen & Best, 2005).
- 'While significant risk factors for opioid overdose fatality are well recognised, the mechanism of fatal overdose remains unclear' (Warner-Smith et al., 2001).
- While the review did not reveal any new information on this point, the decision analysis shows how predictors of fatality can be clarified.

2.14 What are the consequences of a non-fatal overdose (for example, on morbidity)?

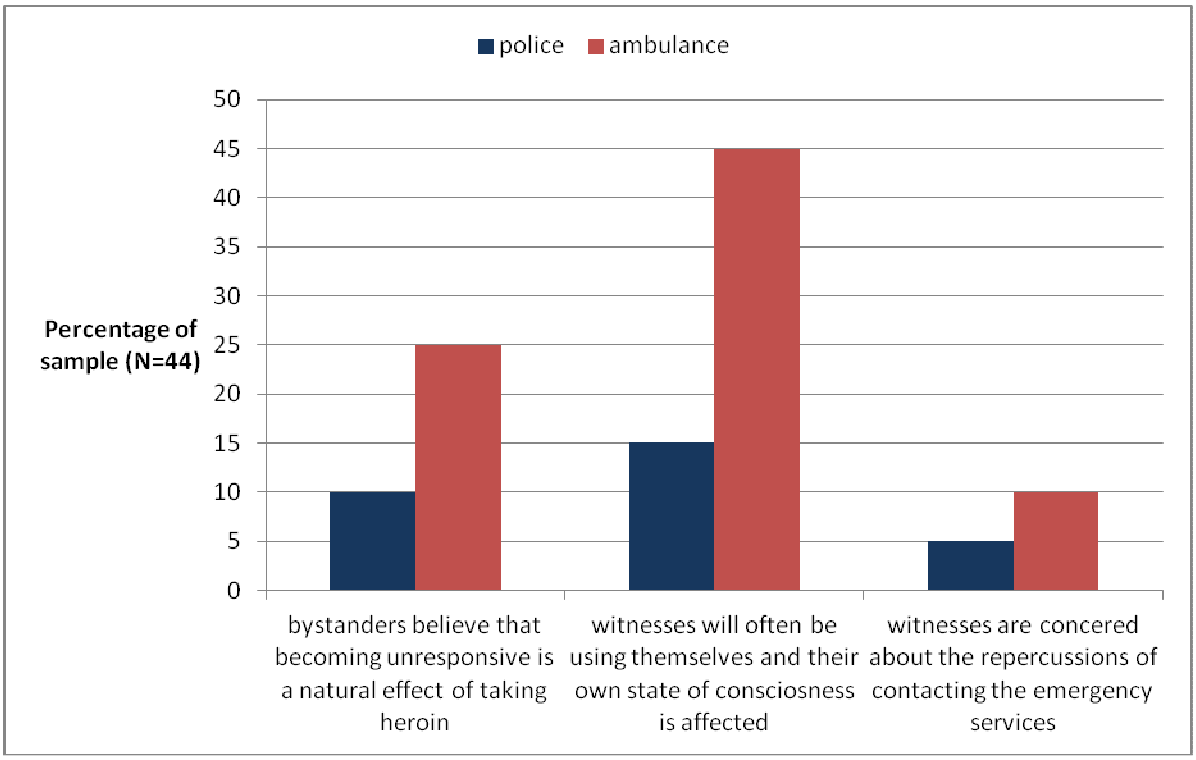
- No evidence (from this review) that behaviour is modified in such a way as to reduce the likelihood of future overdoses.
- No evidence (from this review) that it has an impact on morbidity. However, several papers have noted that heroin overdose can cause cognitive impairment and neurological deficits (e.g. Brvar et al., 2005).

2.15 What are the views of emergency services who attend the scene of an overdose? (see Figure 8)

- 25 % of respondents stated that, generally speaking, overdose incidents they are called to occur in potentially dangerous and hostile situations (Rome et al., 2008).
- Where witnesses intervene, this is regarded by police and ambulance staff to be largely helpful (Rome et al., 2008).
- Further medical help is often refused by the person who had the overdose (Rome et al., 2008).
- The majority of police and ambulance staff (75 %) do not provide written information to those present at the scene of an overdose (Rome et al., 2008).

- ‘In every single case, they (i.e. the drug users) are not interested. Family members may take a bit of attention’. Scottish Paramedic (Rome et al., 2008).

Figure 8. Why bystanders delay calling an ambulance according the emergency service workers



Source: (Rome et al., 2008).

3 Discussion

The review has highlighted factors that facilitate and impede overdose prevention. Before considering these, it is worthwhile highlighting previous recommendations.

Best et al. (2001) assert that 'most overdoses and deaths are avoidable'. They suggest that 'dose is rarely the sole cause — other factors turn the potential for risk into a real danger and these factors can be changed by the user and by interventions'. A very important factor appears to be using other depressant drugs (alcohol or benzodiazepines) at the same time.

Risk factors that can potentially be targeted by interventions are injecting, suicidal tendencies, resuming use after a break (often after imprisonment) and using in situations where no one else is available to summon help. The toxicity of available heroin and substitutes/supplements which are attractive to addicts can have a major impact on the death rate.

Best et al. (2001) recommend methadone maintenance as a treatment that 'effectively reduces the risk of overdose'. Improving uptake and retention is an important way to reduce the death rate. However, they acknowledge barriers. Firstly, the addict has to remain in treatment. Secondly, without adequate controls, drugs diverted from maintenance prescribing can increase deaths among non-patients, but stringent controls could mean fewer addicts enter and stay in treatment, increasing their risk of overdose.

Best et al. (2001) recommend that services should be 'providing information on the risks, encouraging users to protect themselves and others, and developing care plans based on an assessment of risk'. However, it is not clear to what extent services already do this.

Finally, Best et al. (2001) recommend that, 'if they witness an overdose, heroin users should be encouraged to immediately summon emergency services in the knowledge that only in exceptional circumstances would police be called to the scene and/or make an arrest'. However, a barrier to this is that 'reassurance is contingent on local protocols being worked out'.

The review by Rome et al. (2008) made several recommendations:

1. Improve the quality of existing responses to overdose incidents (police and ambulance).
2. Improve the assessment of needs.
3. Improve and extend current care provision for drug users.
4. Information and training for emergency service staff.
5. Information and training for drug users and significant others.

Rome et al. (2008) highlight a 'cycle of overdose management'. Column 2 of Table 5 contains an assessment of issues relating to each stage of the cycle.

Table 5. Stages in the cycle of overdose management

Stages in the cycles (Rome et al., 2008)	Issues at each stage of the cycle
Assessment of needs	This needs to be holistic; not just focusing on drug use. Where and when should assessment be made? How should overdose risk be conceptualised?
Harm reduction strategies	Various strategies have been suggested and implemented. It is unclear which strategies are effective (see 'Table 6. Expert assessment of priority of overdose prevention measures').
Reduce risk	Drug users' behaviour and knowledge may impede efforts to reduce risk
Recognise overdose	'Those who have witnessed an overdose can recognise the signs and symptoms. What is not clear is if they were able to do this before their experience of witnessing an overdose incident or not' (Rome et al., 2008).
Manage overdose situation	Witnesses may be willing and able but impeded by factors such as diffusion of responsibility, fear of police involvement, lack of confidence, own intoxication
Get person to hospital	Possible negative attitudes of some health professionals has been mentioned in the literature
Manage medical emergency	Lack of protocols or liaison between services

It is relatively straightforward to make recommendations that potentially could prevent overdoses. However, it is clear from the above that there are barriers at several levels — firstly for drug users, secondly for witnesses, and thirdly for service providers.

Without understanding the dynamics of these groups, the impact of recommendations is likely to be limited. For example, is a drug user willing to forgo the pleasure produced by injecting drugs to decrease their risk of overdose? If so, for how often? In what circumstances? The importance of this is highlighted by the following quote:

> 'If the reduction in utility associated with these factors outweighs the improvements in utility associated with the health outcome, then from the patient's perspective, the treatment represents a net reduction in well-being.' (Birch & Ismail, 2002).

This statement was made in the context of dental treatment, but has obvious corollaries in relation to overdose. Thus, in the final section, we summarise recommendations, potential actions and the barriers to their implementation.

In Fife, Scotland Baldacchino and colleagues have developed a questionnaire in order to identify trends and patterns within such deaths with the aim of preventing future incidences. (see Appendix 2).

Appendix 3 is a case vignette of a typical drug death victim in Fife, Scotland. The vignette highlights the issues in implementing measures to prevent fatal overdose.

4 Recommendations

This section makes recommendations that could facilitate reduced fatal overdoses but also notes barriers. The content of the review was discussed and reviewed at a meeting in Dundee, Scotland on 1 April 2010. Attending the meeting were Martin Frisher (Keele University), Alex Baldacchino (Consultant Psychiatrist NHS Fife and Clinical Senior Lecturer in Addictions, Centre for Addiction Research and Education Scotland (CARES), Dundee University), Kenny Cameron (Drugs Strategy Officer, Scottish Crime And Drug Enforcement Agency), Dr Julia Neufeind (Drug Deaths Researcher, Fife Alcohol and Drug Partnership and Researcher in CAMHS and Public Health, NHS Fife), Mandy Young, Fife ADP, Overdose Prevention Coordinator, Fife NHS Addiction Services, NHS Fife, Tahira Akbar (Researcher, Centre for Addiction Research and Education Scotland (CARES), Dundee University).

The group focused on the extent to which measures might impact among the population of opiate users for a while. As mentioned in the introductory note the expert group was ad-hoc and geographically specific; other groups might have come to different conclusions.

Table 6 gives an overview of recommendations based on the literature as well as barriers mentioned. It also includes the expert group assessment of feasibility and efficacy.

Table 6. Overdose prevention: recommendations, barriers and expert assessment

Prevention - Institutional	**Recommendation**	• **Barriers**	**Expert assessment of feasibility**	**Expert assessment of efficacy**
Prison Coordinated release from prison	• Identify and implement potential interventions that can reduce drug deaths in recently-released prisoners, e.g. links to treatment in the community. • EMCDDA recommends that pre-release counselling should be extended (EMCDDA, 2009). • If deaths following recent release from prison were eliminated, this could reduce fatal overdose by 15 %. (Department of Health, 2007)	• Patient dynamics, e.g. desire to take drugs outweighs other considerations. • Ignorance of, or not caring about, reduced tolerance. • Lack of coordination with community services e.g. housing, substance misuse other social services. • Day of release can be changed with little warning or take place on Friday or weekend.	This depends on institutional arrangements in Member States.	The expert group felt there was considerable regional variation.
Police custody cells ***— Arrest referral*** Targeted	The expert group considered this to be an important point of access for at risk individuals.	At present little is done in this setting in some places.	The expert group assessed this as having high feasibility.	The expert group assessed this as potentially having a high

prevention of at risk individuals (Arrested individuals known to be drug users).				level of efficacy having high feasibility.
Prevention — Public Health	**Recommendation**	**Barriers**	**Expert assessment of feasibility**	**Expert assessment of efficacy**
Pharmacology /Toxicology Disseminating information on purity levels, composition and quantity of drugs involved in fatal overdoses.	• Create an environment where such information is available. • Consolidate links with toxicologists to produce detailed and accurate reports • Vignette: 'Heath Ledger died from accidental drug overdose, medical examiner says' http://seattletimes.nwsource.com/html/movies/2004168938_heath07.html	• Information systems are not adequate e.g. updated on changing risks of some drugs • Data is not shared and coordinated • Data is not disseminated to drug users and health professionals • Translation of analysis of information into user-friendly format • Health professionals have a role in making drug users aware • Will drug users change their behaviour as a result?	In principle it is a good idea to make drug users and health professionals more aware of the overdose risks of specific drugs and drug combinations. However, current information tends to be generic. Also the role of specific drugs in the death is not always clear or straightforward. Even if such information is available, its utility is unclear.	It is difficult to specify efficacy. Information is often not available in a manner likely to influence drug users' behaviour.
Information Better exchange of information and recording of 'near misses'.	• Closer liaison between emergency services and other services e.g. substance misuse, mental health, Accident and Emergency (A & E), police and ambulance • Vignette: Emergency Services Crews confronted with heroin-fentanyl overdoses (ODs) http://www.jems.com/article/medical-emergencies/clinical-alert-new-high	• Collating and analysing this information. • Ensuring responders have access to the information.	There is considerable regional variation on the quality of information.	It is difficult to specify efficacy.

Decision support Providing drug uses and health professionals with more targeted information about overdose.	Improve the quality of interaction between health professionals and drug users by providing patient-specific assessment of overdose risk.	• Engaging drug users. • Engaging health professionals	Pilot scheme to evaluate decision support with health professionals and drug users is necessary by different methods in different settings.	As yet, there are no trials of decision support systems. Computerised decision support has been shown to improve best practice (Kawamoto et al., 2005).
Prevention — Treatment	**Recommendation**	**Barriers**	**Expert assessment of feasibility**	**Expert assessment of efficacy**
Methadone maintenance	• Increase provision • Ensure people do not leave because of strict monitoring • Create an environment where user understands the needs for monitoring due to the risks • Ensure person is in effective treatment program and is not using methadone or illicit drugs from other sources • Ensure optimal dose of between 60–120 mg • Vignette: Management of Opioid Dependence http://www.medscape.com/viewarticle/452723	• Diversion to illicit market • Combining with other drugs alcohol, benzodiazepines and prescription drugs (medical use or non-medical use) • Many doctors do not want to prescribe higher range doses • Difficult to monitor in practice	Experience has shown this measure is feasible (if controversial).	Many studies have shown this measure to be efficacious. However, the barriers may have contributed to the problems as well (i.e. overdose caused by methadone).

Naloxone	• Wider training and implementation of Naloxone • Vignettes: Overdose rescue kits save lives http://www.npr.org/templates/story/story.php?storyId=17578955	• Not legally available • User might use more drugs than without Naloxone	More pilot schemes are required. The expert group noted that other antidote drugs could also be considered.	Some studies have shown this measure to be efficacious.

	• Medical and legal issues keep overdose antidote out of users' hands http://www.mapinc.org/drugnews/v00.n010.a04.html			
Assessment and treatment of physical and psychiatric/ psychological health and significant life events	• Shared assessment and further integration of services should encourage sharing of information and treatment plans • Targeted interventions for high-risk patients	• Users not in touch with services • Poor coordination between agencies • Willingness to engage with treatment • Attitude of health professionals • Is there evidence that such assessment is effective?	Not directly considered, but see comments on efficacy (next column).	The expert group felt that this was perhaps the most important factor in overdose prevention.
Specialist nurses in Accident and Emergency departments	Ensure such nurses are in place	Is there evidence for effectiveness?	Unclear	Difficult to quantify.
Safe injecting rooms	Provide safe injecting rooms	• Resistance from communities, legal authorities, etc. • Do drug users want them?	Depends on removal of barriers.	Likely to be efficacious.

Prevention — individual	**Recommendation**	**Barriers**	**Expert assessment of feasibility**	**Expert assessment of efficacy**
Provide accurate information to drug users	Disseminate information on key risk and protective factors	• Do drug users act on such information? • Drug users often engage in inappropriate interventions • Previous overdose does not seem to be a deterrent	Important to assess under what circumstances drug users would change their behaviour.	Could be efficacious, depending on comments in feasibility column.

CPR training	Provide CPR training	• Would drug users participate or remember CPR training? • Not only drug users, but friends and family	Measure is feasible.	The noted barrier means the efficacy of this measure is unclear.
Use of antidepressant drugs	• Ensure antidepressant drugs are not over-prescribed • Safety measures required, e.g. coordination of mental health and substance misuse	Use of antidepressant drugs is part of their substance misuse but also part of treatment of comorbidity.	• Difficult to implement • In what way? Could be dispensed frequently and monitored? Patient regularly reviewed for mental health	Likely to be efficacious if implemented. Using the consultative and integrated models rather than serial or parallel models in comorbid conditions.

Overdose response — Setting	**Recommendation**	**Barriers**	**Expert assessment of feasibility**	**Expert assessment of efficacy**
Bystanders If individuals have others close to them at the time of overdose, this provides the opportunity for overdose training for these individuals.	• Education, integration and delivery of effective interventions • Family members of drug users should be provided with overdose training so they can recognise signs of overdose, such as snoring • Family members, peers, general population ought to be provided with CPR training, which would allow them to intervene and, perhaps, prevent the death	• Substance misusers do not want training • Bystanders are themselves intoxicated • Witnesses leave the scene of the overdose • Diffusion of responsibility • Drug users who survive an overdose and go on to witness others having an overdose are less likely to intervene (Tobin) • Possible repercussions, e.g. children are in the house	Difficult to translate into action due to barriers.	Depends on removal of the barriers.
Police	Ensure police do not attend overdose unless a death has occurred	Overdose incidents can occur in potentially dangerous and hostile	This already happens in some place but there are other issues, e.g. child	Unclear

		environments, where police may have to attend.	protection.	
Ambulance	Trained in Naloxone use. Vignette: http://www.jems.com/news_and_articles/articles/jems/3201/clinical_alert_the_new_high.html	May not be routine in some areas.	Should be feasible in most settings.	Efficacious in dealing with near misses. Direct referrals from ambulance to treatment services as an option of improving therapeutic opportunities for those who have recently overdosed.

After considering the information in Table 6, the expert groups discussed the measures. The key point is the group viewed overdose prevention as a multifaceted problem. Purely technological interventions were though likely to have a relative limited impact. Rather, overdose involves personal and societal issues; only when these are addressed is the level of fatal overdose likely to decrease.

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Appendices

6 Appendix 1: Analysis of overdose papers

Each paper mentioned was summarised with respect to:

1. Intervention or activity related to overdose
2. Did the intervention/activity increase or decrease the likelihood of fatal overdose?
3. Study population
4. Defined outcome, e.g. non-fatal or fatal overdose
5. Issues arising
6. Country where the study was conducted
7. Reference

The papers are categorised as follows.

1. Risk factors (individual and social)
    a. Patterns of drug use
    b. Other health factors
    c. Suicide risk
    d. Psychosocial factors
2. Treatment interventions to prevent overdose
    a. Methadone
    b. Naloxone
    c. Other prescriptions
    d. Safe injecting rooms
    e. Engagement with services
3. Organisational responses
    a. Emergency responses
4. Responses following overdose
    a. Other drug users/overdose witnesses

	Intervention or activity related to overdose	Increase or decrease likelihood of fatal overdose	Study population	Defined outcome	Issues arising	Country	Reference
1	**Risk factors (individual and social)**						
1.a	Patterns of drug use						
1.a	Reduction in rate of injecting behaviour.	↓ Decrease	Drug injectors?	Overdose		Scotland	Neale & Robertson, 2005. *op. cit.*
1.a	Alcohol and opiate-based drugs in combination with SSRI anti-depressants.	↑ Increase	Not stated	Fatal anti-depressant overdose (FAO).	93 % of deaths from SSRIs occurred in combination with other drugs, especially TCAs (24.5 %).	UK	Cheeta, S., Schifano, F., Oyefeso, A., et al. (2004). Antidepressant-related deaths and antidepressant prescriptions in England and Wales, 1998–2000, *British Journal of Psychiatry*, 184, pp. 41–47.
1.a	Very high levels of drug intake, with users experiencing difficulty in controlling their drug intake.	↑ Increase	Not stated	Non-fatal overdose		Dorset	Bennett et al., 1999
1.a	High levels of polydrug use and prescription drug use; increasing use of multiple doctors; excessive increases in psychoactive drug prescriptions.	↑ Increase	Not stated	Died of heroin-related overdose.		Australia	Martyres, R.F., Clode, D. & Burns, J.M. (2004), 'Seeking drugs or seeking help? Escalating "doctor shopping" by young heroin users before fatal overdose', *Medical Journal of Australia*, 180, pp. 211–214.
1.a	Period of abstinence from regular use.	↑ Increase	Accidental fatalities	Suggests that decreased tolerance is a key factor in fatal overdose. Suggested that one in five deaths were after a period of abstinence from regular use.	Reduced tolerance to opioids. Frequently reported reasons for abstinence were imprisonment and hospital admission.	Sheffield	Oliver, P. & Keen, J. (2003), 'Concomitant drugs of misuse and drug using behaviours associated with fatal opiate related poisonings in Sheffield, UK, 1997-2000', *Addiction*, 98, pp. 191–197.

1.a	Two weeks after release, from prison compared to at other times of liberty.	↑ Increase	Drug-related mortality	Drug-related mortality seven times higher in first two weeks of liberty than at other times.		UK	Bird, S. & Hutchinson, S. (2003), 'Male drugs-related deaths in the fortnight after release from prison: Scotland, 1996–99', *Addiction*, 98, pp. 185–190.
1.a	Sporadic use of heroin	↑ Increase	Not stated	Not stated	Particular significance in cases of heroin-related deaths involving administration routes other than injection.	Stock-holm	Thiblin, I., Eksborg, S., Petersson, A., et al. (2004), 'Fatal intoxication as a consequence of intranasal administration (snorting) or pulmonary inhalation (smoking) of heroin', *Forensic Science International*, 139, pp. 241–247.
1.a	Periods of induction and transition, such as when drug users (re)enter or discontinue treatment.	↑ Increase	Not stated	Not stated		Australia	Bell and Zador, 2000.
1.a	Benzodiazepine use	↑ Increase	Drug injectors?	Overdose		England	Stewart et al., 2002. *op. cit.*
1.a	Benzodiazepine use	↑ Increase		28-fold increase in risk of overdose with benzodiazepine use.		Australia	Dietze, P., Jolley, D., Fry, C., et al. (2005), 'Transient changes in behaviour lead to heroin overdose: Results from a case-crossover study of non-fatal overdose', *Addiction*, 100, pp. 636–642.

1.a	Benzodiazepine use	↓↑ Increase or decrease depending of circumstances	Drug injectors?	Overdose		Scotland	Neale, J. & Robertson, M. (2005) Recent life problems and non-fatal overdose among heroin users entering treatment. *Addiction*, 100, pp. 168–175.
1.a	Large quantities of alcohol	↑ Increase	Not stated	Not stated		England	Stewart et al., 2002. *op.cit.*
1.a	Large quantities of alcohol	↑ Increase	Not stated	Those drinking large amounts of alcohol were at greater risk of overdose.		Various	Gossop et al., 2002, McGregor, C., Darke, S., Ali, R., et al. (1998), 'Experience of non-fatal overdose among heroin users in Adelaide, Australia: Circumstances and risk perceptions', *Addiction*, 93, pp. 701–711.
1.a	Injecting cocaine users	↑ Increase	Not stated	Cocaine overdose was more common among injecting cocaine users.		USA	Bernstein, K.T., Bucciarelli, A., Piper, T.M. et al. (2007), 'Cocaine- and opiate-related fatal overdose in New York City, 1990–2000', *BMC Public Health*, 7, p. 31.
1.a	Injecting drug use in public places	↑ Increase	Not stated	Injecting in public places strongly associated with overdose.		Scotland	Taylor, A., Cusick, L., Kimber, J. et al. (2006), *The Social Impact of Public Injecting* (Paper D).

1.a	Changes in police activity whereby dealing and use at static sites, such as houses, is displaced to street dealing in other areas.	↑ Increase	Not stated	Not stated		Australia	Fitzgerald, J., Hamilton, M. & Dietze, P. (2000), 'Walking overdoses: A re-appraisal of non-fatal illicit drug overdose', *Addiction Research*, 8, pp. 327–355.
1.a	Public injecting	↓ Decrease	Not stated	Not stated	Public intervened to help overdosed or unconscious drug users. Some did this as part of their job, and others did it voluntarily.	Scotland	Taylor et al., 2006. *op. cit.*
1.b	Other health factors						
1.b	High levels of hepatitis and cirrhosis	↑ Increase	Not stated	Not stated	May increase the risk of hypoxia-induced cardiac arrest and arrhythmia.	Australia	Darke, S., Kaye, S. & Duflou, J. (2006), 'Systemic disease among cases of fatal opioid toxicity', *Addiction*, 101, pp. 1299–1305.
1.b	Progressive disease burden	↑ Increase	Not stated	Not stated		Australia	Darke et al., 2006. *op.cit*
1.c	Suicide risk						
1.c	Opiate users	N/A	Not stated	Fatal overdose	Difficulties in distinguishing between accidental and intentional overdose.	England	Farrell, M., Neeleman, J., Griffiths, P., et al. (1996), 'Suicide and overdose among opiate addicts', *Addiction*, 91, pp. 321–323.
1.c	Methadone	↑ Increase	Not stated	Overdose suicide		UK	Oyefeso, A., Ghodse, H., Clancy, C., et al. (1999), 'Suicide among drug addicts in the UK', *British Journal of Psychiatry*, 175, pp. 277–282.
1.c	Distressing life event	↑ Increase	Not stated	Not stated	Intentional overdoses	UK	Neale, 2000.

1.c	Suicidal ideation	↑ Increase	Not stated	Non-fatal overdose		England	Stewart et al., 2002. *op. cit.*
1.c	History of mental health problems, a current psychiatric diagnosis and having been prescribed psychotropic medicines	↑ Increase	Not stated	Fatal non-deliberate overdose		UK	Oliver, P., Horspool, M., Rowse, G., et al. (2007), *A Psychological Autopsy Study of Non-Deliberate Fatal Opiate-Related Overdose,* London: National Treatment Agency for Substance Misuse.
1.c	Problem drug users expressing suicidal ideation	↑ Increase	Not stated	Not stated		Scotland	Jones, R., Gruer, L., Gilchrist, G., et al. (2002), 'Recent contact with health and social services by drug misusers in Glasgow who died of a fatal overdose in 1999', *Addiction*, 97, pp. 1517–1522.
1.c	Feelings of indifference and carelessness	↑ Increase	Not stated	Not stated	Overdose survivors		Rossow, I. & Lauritzen, G. (1999), 'Balancing on the edge of death: Suicide attempts and life-threatening overdoses among drug addicts', *Addiction*, 94, pp. 209–219.
1.d	Psychosocial factors						
1.d	Increasing age	↑ Increase	Not stated	Number of overdose episodes		Australia	Warner-Smith, M., Darke, S., Lynskey, M., et al. (2001), 'Heroin overdose: Causes and consequences', *Addiction*, 96, pp. 1113–1125.
1.d	Length of time that people have used	↑ Increase	Not stated	Not stated	Length of time may be stronger indicator than chronological age.	Australia	Bartu et al., 2004. *op. cit*

1.d	More self-reported psychological health problems at treatment intake and at one year follow-up.	↑ Increase	Not stated	Non-fatal overdose		England	Stewart et al., 2002. *op. cit.*
1.d	More drug injectors in the social network; experiencing conflict with more network members	↑ Increase	Not stated	Not stated	Number of drug injectors in a person's social network and number of networks they are in conflict with.	USA	Latkin, C.A., Hua, W. & Tobin, K. (2004), 'Social network correlates of self-reported non-fatal overdose', *Drug and Alcohol Dependence*, 73, pp. 61–67.
1.d	Accommodation problems	↑ Increase	Not stated	Not stated	Obtaining a tenancy could increase the potential for fatal overdose due to solitary drug use.	England	Neale & Robertson, 2005. *op. cit.*
1.d	Hostel accommodation	↑ Increase	Not stated	Not stated	Paradoxically, although the hostel setting could contribute to one risk factor (increased heroin consumption), the practice of using in a group could also protect against fatal overdoses due to the presence of a third party who could attempt resuscitation and / or alert emergency services.	England	Wright, N., Oldaham, N. & Jones, L. (2005), 'Exploring the relationship between homelessness and risk factors for heroin-related death: A qualitative study', *Drug and Alcohol Review*, 24, pp. 245–251.

2	**Treatment to prevent overdose**						
2.a	2a. Methadone						
2.a	Methadone diversion	↑ Increase	33 drug overdose casualties attending six accident and emergency departments in two Scottish cities	Non-fatal overdose	Tighter supervision of methadone consumption in pharmacies and drug clinics.	Scotland	Neale, 2000. *op. cit.*
2.a	Casualties that consumed methadone prior to overdose cited a range of explanations — from unintentionally taking too many drugs and unexpected heroin purity to a lower tolerance or ingesting unknown tablets.	↑ Increase	33 drug overdose casualties attending six accident and emergency departments in two Scottish cities	Non-fatal overdose		Scotland	Neale, 2000. *op. cit.*
2.a	Greater benefit being accrued from offering most individuals on methadone maintenance a daily dose between 60 mg and 120 mg.	↓ Decrease	Not stated	Higher doses shown to encourage treatment retention and reduce illicit drug use in methadone maintenance regimens.		England	National Treatment Agency for Substance Misuse (2004). *op. cit.*
2.a	Strict rules (for methadone programmes) increasing the risk of discharge, resulting in a high mortality rate.	↑ Increase	Opiate users who had been in contact with a methadone treatment programme	Fatal heroin overdose		Sweden	Fugelstad et al. (2007). *op.cit.*
2.a	Methadone — where tolerance is reduced	↑ Increase	Methadone-related mortality	Not stated		UK	Wolff and colleagues (2002)
2.a	Methadone dose is increased too quickly, or the initial dose is too high.	↑ Increase	Methadone-related mortality	Not stated	Problems may arise if the person's methadone dose is increased too quickly, or if the initial dose is too high.	UK	Wolff, K. (2002) Characterisation of methadone overdose: Clinical considerations and the scientific evidence. *Therapeutic Drug Monitoring*, 24, pp. 457–470.

2a	Overdose situations related to methadone and methadone treatment: • Topping up on a legitimate methadone prescription. • Using someone else's methadone prescription. • Preferring illegal drug use to prescribed methadone. • Unable to access a methadone prescription.	↑ Increase	33 drug overdose casualties attending six accident and emergency departments in two Scottish cities	Non-fatal overdose		Scotland	Neale, J. (2000), 'Suicidal intent in non-fatal illicit drug overdose', *Addiction*, 95, pp. 85–93.
2a	Unable to obtain substitute medication	↑ Increase	33 drug overdose casualties attending six accident and emergency departments in two Scottish cities	Non-fatal overdose	Substitute prescribing should include opinions and concerns of drug users.	Scotland	Neale, 2000. *op. cit.*
2a	2a. More frequent users of illicit methadone	↑ Increase	Clients in treatment	Overdosed in the three months prior to treatment	Cullen notes that most people involved in a structured methadone programme reported continued illicit drug use.	England	Stewart, D., Gossop, M. & Marsden, J. (2002), 'Reductions in non-fatal overdose after drug misuse treatment: Results from the National Treatment Outcome Research Study (NTORS)', *Journal of Substance Abuse Treatment*, 22, pp. 1–9.
2.b	Naloxone						

2.b	2b. Take-home-Naloxone (THN)	↓ Decrease	Not stated	Overdose fatalities	Two thirds of the 69 overdose fatalities could have been prevented with immediate administration of THN. Most drug overdose deaths occur in the company of others.	England	Strang, J., Powis, B., Best, D., et al. (1999), 'Preventing opiate overdose fatalities with Take-home Naloxone: Pre-launch study of possible impact and acceptability', *Addiction*, 94, pp. 199–204.
2.b	2b. Take-home-Naloxone (THN)	↓ Decrease	18 overdoses were witnessed and 10 Naloxone administrations	Success in overdose reversal	Biggest challenge was to raise awareness and provide training.	England	Strang, J., Manning, V., Mayet, S., et al. (2007), *The Naloxone Programme: Investigation of the wider use of naloxone in the prevention of overdose deaths in pre-hospital care*, London: National Treatment Agency for Substance Misuse.
2.b	2b. Take-home-Naloxone (THN): Drug users were unlikely to engage in riskier drug-taking activity	↓ Decrease	Not stated	Not stated		USA	Worthington, N., Piper, T.M., Galea, S., et al. (2006), 'Opiate users' knowledge about overdose prevention and Naloxone in New York City: A focus group study', *Harm Reduction Journal*, 3.

2.b	Take-home-Naloxone (THN)	↑ Increase	Not stated	Not stated	46 % stated that they might not be able to dissuade the casualty from using more heroin following THN administration		Seal, K.H., Downing, M., Kral, A.H., et al. (2003), 'Attitudes about prescribing Take-home Naloxone to injection drug users for the management of heroin overdose: A survey of street-recruited injectors in the San Francisco Bay area', *Journal of Urban Health*, 91, pp. 1842–1846.
2.b	Intranasal Naloxone	↓ Decrease	Not stated	Safe and effective option		USA	Kerr, D., Dietze, P. & Kelly, A.M. (2008), 'Intranasal Naloxone for the treatment of suspected heroin overdose', *Addiction*, 103, pp. 379–386.
2.c	Other prescription medications						
2.c	Not always taking prescribed medication, which may have prompted reduced drug tolerance, withdrawals and an increased susceptibility to overdose.	↑ Increase	33 drug overdose casualties attending six accident and emergency departments in two Scottish cities	Non-fatal overdose		Scotland	Neale, 2000. *op. cit.*
2.c	Access to anti-depressants through genuine prescriptions; obtaining different antidepressants from different prescribers.	↑ Increase	Not stated	Fatal anti-depressant overdose (FAO).	Carefully evaluate drug abuse history of women with an affective disorder to reduce the risk of antidepressant misuse.	England	Oyefeso, A., Valmana, A., Clancy, C., et al. (2000), 'Fatal antidepressant overdose among drug abusers and non-drug abusers', *American Journal of Preventive Medicine*, 31, pp. 261–264.
2.d	Safer injecting rooms						

2.d	Advocates of safer injecting rooms (SIRs) claim that these facilities can help reduce harms associated with intravenous drug use, such as heroin overdose levels (fatal and non-fatal)	↓ Decrease	Not stated	Not stated	Depends on variables, such as the extent to which they reach their target population and the number of deaths occurring outside that target population — for example, those who use in private and those who use among more socially integrated users.		Hunt, N. (2006), *The evaluation literature on drug consumption rooms* (Paper B).
2.d	Safer injecting rooms (SIRs)	↓ Decrease		Staff assisted in 377 cases, 52 % involving respiratory arrest. No overdose deaths.	Decreased risk of fatal overdose	Barcelona, Spain	Anoro, M., Lundain, E. & Santisteban, O. (2003), 'Barcelona's safer injection facility — Eva: A harm reduction program lacking official support', *Journal of Drug Issues*, 33, pp. 689–712.
2e	Engagement with services						
2.e	Retention for long-term and maintenance clients as a means of preventing overdose and importance of adequate follow-up.	↓ Decrease	Not stated	Risk of overdose in first 30 days after stopping/ completing treatment was three times higher, compared to 31 days or more.	The importance of adequate follow-up among abstinence-based treatment providers and educating drug users about the risks of post-treatment relapse and overdose	Italy	Davoli, M., Bargagli, A.M., Perucci, C.A., et al. (2007), 'Risk of fatal overdose during and after specialist drug treatment: The VEdeTTE study, a national multi-site prospective cohort study', *Addiction*, 102, pp. 1954–1959.

2.e	Range of measures from encouraging peers to seek medical help to providing them with controlled amounts of methadone or buprenorphine to ensure the casualty experiences some relief from drug withdrawal.	↓↑ Increase or decrease depending on circumstances	Not stated	Witnesses only called an ambulance in about one in 10 overdose incidents. No reported intervention took place in nearly eight out of 10 deaths.	Piper and colleagues (2007) conclude that programme experiences and data show that these initiatives are a feasible option in training drug users to respond effectively to overdose by administering THN. Need for flexibility and simplicity in development and implementation.		Lenton, S. & Hargreaves, K. (2000), 'A trial of Naloxone for peer administration has merit, but will the lawyers let it happen?' *Drug and Alcohol Review*, 19, pp. 365–369.
2.e	Previous hospital contact (within five years of death).	↓ Decrease	Drug-related deaths	Not stated	Other European studies have also identified missed opportunities for intervening in medical settings Pollini et al, 2006; Cook, S., Moeschler, O., Michaud, K., et al. (1998), *Addiction*, 93, pp. 1559–1565. The studies noted that the number of patients receiving treatment information from emergency departments or hospital staff was low, as were the numbers referred on to drug treatment.	UK	Thanacoody, R., Jay, J. & Sherval, J. (2007), 'The association between drug-related deaths and prior contact with hospital-based services'. Unpublished at the time of the review.

2.e	Periods of hospitalisation providing a 'unique' opportunity for appropriate interventions to be targeted at these high-risk patients.	↓ Decrease	Not stated	Methadone-related deaths	60% had attended accident and emergency departments for deliberate self-harm or accidental overdose.	UK	Fiddler, C., Squires, T., Sherval, J., et al. (2001), 'A review of GP records relating to methadone-associated deaths in the Lothian region of Scotland 1997–9', *Journal of Substance Use*, 6, pp. 96–100.
2.e	Substance use specialist nurses within the accident and emergency department to progress referral for drug overdose casualties.	↓ Decrease	Accident and emergency department	Not stated		Scotland	Rome, A., Shaw, A. & Boyle, K. (2008), *Reducing drug users' risk of overdose,* Edinburgh, Scottish Government Social Research.
2.e	Poor treatment response	↑ Increase	Not stated	Non-fatal overdose	Many treatment episodes for drug users are suddenly or prematurely terminated with no opportunity for transition.	Canada	Fischer, B., Brissette, S., Brochu, S., et al. (2004), 'Determinants of overdose incidents

							among illicit opioid users in 5 Canadian cities', *Canadian Medical Association Journal*, 171, pp. 235–239.

2.e	Leaving treatment	↑ Increase	Not stated	Overdose		Australia	Bartu, A., Freeman, N.C., Gawthorne, G.S., et al. (2004), 'Mortality in a cohort of opiate and amphetamine users in Perth, Western Australia', *Addiction*, 99, pp. 53–60; Digiusto, E., Shakeshaft, A., Ritter, A., et al. (2004), 'Serious adverse events in the Australian National Evaluation of Pharmacotherapies for Opioid Dependence (NEPOD)', *Addiction*, 99, pp. 450–460.
2.e	Engaged in treatment	↓ Decrease	Not stated	Risk of death	Overdose declined by half following enrolment in treatment. Risk further reduced the longer they stayed in treatment (Darke et al., 2005)	Perth, Australia (Bartu *op. cit.*)	Darke, S., Williamson, A., Ross, J., et al. (2005), 'Non-fatal heroin overdose, treatment exposure and client characteristics: Findings from the Australian Treatment Outcome Study (ATOS)', *Drug and Alcohol Review*, 24, pp. 425–432; Fugelstad, A., Stenbacka, M., Leifman, A., et al. (2007), 'Methadone maintenance treatment: The balance between life-saving treatment and fatal poisonings', *Addiction*, 102, pp. 406–412.

2.e	Greater number of separate treatment episodes.	↑ Increase	Not stated	Greater number of overdoses	Importance of treatment stability, longer spells in services and less treatment episodes to improve outcomes.	Australia	Darke et al. (2006). *op. cit.*
2.e	Withdrawal from drug treatment	↑ Increase		Unintentional illicit drug overdose	Most deaths occurred among those out of treatment for more than two weeks.	Italy	Preti, A., Miotto, P. & de Coppi, M. (2002), 'Deaths by unintentional illicit drug overdose in Italy, 1984–2000', *Drug and Alcohol Dependence*, 66, pp. 275–282.
2.e	Increasing the availability of treatment among heroin users both in the community and in prison	↓Decrease	Not stated	Drug-related deaths		England	Hickman, M., Carrivick, S., Paterson, S., et al. (2007), 'London audit of drug-related overdose deaths: Characteristics and typology and implications for prevention and monitoring', *Addiction*, 102, pp. 317–323.
2.e	Unfavourably discharged from drug treatment programme.	↑ Increase	397 in treatment (followed 110 following discharge) 4/397 died while in treatment; 9/110 died following discharge.	Death rates, especially overdose, are high among patients who are unfavourably removed or withdraw from treatment programmes. Six out of 110 died of heroin overdose in the 12 months following withdrawal	Discharged patients were eight times more likely to be dead compared to those still in treatment	Sweden	Zanis, D.A. & Woody, G.E. (1998), 'One-year mortality rates following methadone treatment discharge', *Drug and Alcohol Dependence*, 52, pp. 257–260.

3	**Emergency organisational responses following overdose**						
3.	Emergency responses						
3.a	Immediate overdose onset	↓Decrease	Not stated	Non-fatality	Because rapid overdoses are more likely to result in witnesses intervening	UK	Best et al., 2001. *op. cit.*
3.a	Slow overdose onset.	↑Increase	Not stated	Fatality	Because slow overdoses are less likely to result in witnesses intervening.	UK	Best et al., 2001. *op. cit.*
3.a	Mapping high-risk areas and identifying those repeatedly overdosing. It also led to the identification of high-risk groups (in this case, young people) not previously identified by services with subsequent help being offered, which included drug counselling.	↓Decrease	Not stated	Emergencies where a diagnosis of heroin or opiate overdose was recorded.	More than half (52 %) of all the 1 087 emergencies were attributed to 189 drug users.	Austria	Seidler, D., Schmeiser-Rieder, A., Schlarp, O., et al. (2000), 'Heroin and opiate emergencies in Vienna: Analysis at the municipal ambulance service', *Journal of Clinical Epidemiology*, 53, pp. 734–741.
3.a	Establishing a database of non-fatal heroin overdoses attended to by ambulance personnel.	↓Decrease	Not stated	Database of non-fatal heroin overdoses	Low police attendance at drug overdose scenes (12 %). Strong links between researchers and the ambulance service may serve as the basis for important future research regarding heroin overdose.	Australia	Dietze et al., 2000. *op. cit.*

3.a	'Fear' of police involvement is a barrier to calling for help.	↑ Increase	Not stated	Not stated	Despite this fear, Dietze et al. (2000) noted low police attendance (12 %) at drug overdose scenes.	Various	Bennett, G.A. & Higgins, D.S. (1999), 'Accidental overdose among injecting drug users in Dorset, UK', *Addiction*, 94, pp. 1179–1190; Pollini et al., 2006; Tobin et al., 2005; Tracey et al., 2005
3.a	Reducing police attendance at the scene of an overdose and decreasing the risk of arrest might increase willingness to call emergency services.	↓ Decrease	Not stated	Not stated	This barrier requires research to provide a better understanding of drug users' fear of arrest and how barriers can be reduced.	Has been tried by some police forces in the UK but not formally evaluated	Pollini et al., 2006. *op. cit.*
4	**Responses following overdoses. Individual responses: Other drug users/overdose witnesses**						
4	Witnesses present at an overdose event are willing to intervene, for example, with Cardiopulmonary Resuscitation (CPR).	↓Decrease	Not stated	Not stated	Evidence of the opportunity and willingness of witnesses to intervene although these may often be inappropriate and wrongly prioritised.	UK	Best, D, Gossop, M, Man, L.H.,et al. (2002), 'Peer overdose resuscitation: Multiple intervention strategies and time to response by drug users who witness overdose', *Drug and Alcohol Review*, 21, pp. 269–274.
4	Past witnesses of a fatal overdose.	↓Decrease	Not stated	Almost twice as likely to call emergency services	Witnessing a fatality may 'sensitise drug users to the seriousness of overdose'	Not stated	Tobin, K.A., Davey, M.A. & Latkin, C.A. (2005), 'Calling emergency medical services during drug overdose: An examination of individual, social and setting correlates', *Addiction*, 100, pp. 397–404.
4	Drug users who have survived an overdose and go on to witness an overdose.	↑Increase	Not stated	They feel more competent in managing the situation themselves.	Less aware of the life-threatening nature of the situation and less likely to call an ambulance	Not stated	Tobin et al., 2005. *op. cit.*
4	Witnesses of overdose events in public areas.	↓Decrease	Not stated	More likely to summon medical help compared to when overdose occurred in a private location.		US	Tracey, M., Piper, T.M., Ompad, D., et al. (2005), 'Circumstances of witnessed drug overdose in New York City: Implications for intervention', *Drug and Alcohol Dependence*, 79, pp. 181–190.

4	Presence of bystanders.	↑Increase	Not stated	Having ever overdosed and having more than four bystanders present independently decreases the chance of calling an ambulance	May decrease the likelihood of calling an ambulance because of 'diffusion of responsibility'		Tobin et al., 2005. *op. cit.*
4	Witnesses remaining with the casualty.	↑↓Increase or decrease depending on response		May help prevent choking or provide a level of sensory stimulation that prevents them falling too far into an overdose state	May try inappropriate measures such as slapping or shaking casualty.	UK	Best et al., 2001. *op. cit.*
4	Witnesses who attempted CPR prior to ambulance arrival.	↓Decrease	Not stated	Improved hospitalisation rates compared to cases where it was not administered	Fears about medical care and police involvement (common barriers to seeking help) may be less acute among those who experienced an overdose and subsequent hospitalisation.	Australia	Dietze, P., Cantwell, K. & Burgess, S. (2002), 'Bystander resuscitation attempts at heroin overdose: Does it improve outcomes?' *Drug and Alcohol Dependence*, 67, pp. 213–218.
4	Witnesses had received information on how to prevent overdose/revive a casualty	↓Decrease	Not stated	Not stated	Reinforces the view that providing relevant information may be an effective strategy to help prevent or reduce further harm, such as related morbidity and deaths.		Pollini et.al., 2006. *op. cit.*

7 Appendix 2. Protocol and Creation of the Drug Deaths Database in Fife

The template utilised in creating the Fife Drug Deaths (DD) Database was formed from a combination of the Centre for Addiction Research and Education Scotland (CARES) questionnaire used in the Scottish Executives National Investigation into Drug Related Deaths in Scotland in 2003 (2005) and extracts from the Scottish Criminal Drug Enforcement Agency (SCDEA) questionnaire. The questionnaire contains the following domains:

1. Demographic Characteristics
2. Life Context and Social Functioning
3. Criminal Justice Issues and Offending History
4. Substances Use History
5. Physical and Psychological Health
6. Service Provisions
7. Additional information

The questionnaire is updated when required, and in 2009 a new version (v3.0) of the Fife Drug Death Questionnaire was adapted in Fife in 2009. This questionnaire is disseminated to all relevant agencies concerned in the provision of care or services to the drug death victim (e.g. CJS, NHS Fife Addiction Services and voluntary bodies such as FIRST and DAPL). Upon completion, the questionnaire(s) are returned to the committee and information pertaining to the domains outlined above is entered into the database. In order to adhere to data protection principles, data is anonymised where possible, and coded accordingly. The database is securely held on a stand-alone machine and housed within the Fife Police Headquarters. The Drug Death Questionnaire is reproduced at the end of this section.

Drug Deaths Database

The main source of information for the current report was the Fife Drugs Death Database (EXCEL/SPSS), which holds all data on Drugs Deaths that have occurred within the Fife area since 2005.

Data Analysis

Data contained within the Drug Deaths Database is collated by one researcher. The process of data collection and analysis broadly involves the following stages:

1. Maintenance the database on a regular basis, entering of new information and regular cleansing of existing data
2. Background research on past/current government directives and relevant literature
3. Extraction of relevant data pertaining to the seven domains of the questionnaire outlines above
4. Data analysis (via Excel/SPSS) and interpretation/synthesis
5. Presentation of results

Data collection sources

Outlined below are lifestyle domains and sources used in data collection:

Domain	**Sources Used**
1. Demographic Characteristics	- Sudden Death Report
	- SCDEA
	- Fife Drug Death Questionnaire
2. Life Context and Social Functioning	- Sudden Death Report
	- SCDEA
	- Social Work Notes, Social Enquiry
	- Criminal Justice Service Reports
	- Psychiatric Reports
	- GP Notes and Correspondences
	- Fife Drug Death Questionnaire
3. Criminal Justice and Offending	- CHS (Criminal History System)
	- CrimeFile
	- Sudden Death Report
	- Post-Mortem/Toxicology Reports
	- Fife Drug Death Questionnaire
4. Substance Use History	- Sudden Death Report
And	- GP Notes and Correspondences
5. Physical and Psychological Health	- Fife Addiction Service Notes
	- Psychiatric Reports
	- Social Work Notes
	- Fife Drug Death Questionnaire
6. Service Use History	All of the above sources
7. Additional Information	All of the above sources

Context: Step-by-step Guide to Data Collection

Step 1

A suspected Drugs Death occurs in Fife and police attend and carry out investigation into the circumstances surrounding the death. The length of the investigation depends upon the individual circumstances and can vary from a few days to a number of months.

Step 2

Police inform the ADP, which in turn disseminates the Fife Drug Death Questionnaire (Appendix C) to all relevant agencies for completion. At this point, Fife Constabulary also request toxicology from the Procurator Fiscal.

Step 3

Agencies check records to see if the individual has accessed their respective services. If the individual is known to a particular agency, the Drug Death Questionnaire is completed by that agency and returned to Fife Police Headquarters (FPHQ) for the attention of the Drug Death Monitoring Group.

Step 4

Police inform NHS Fife of the victim's GP details and the GP notes are requested on behalf of the Drug Deaths Monitoring Group.

Step 5

All questionnaires, case notes and post-mortem/toxicology reports are returned to FPHQ where details are entered into the DD Database. This is generally achieved in a six to eight week period from the time of death.

Step 6

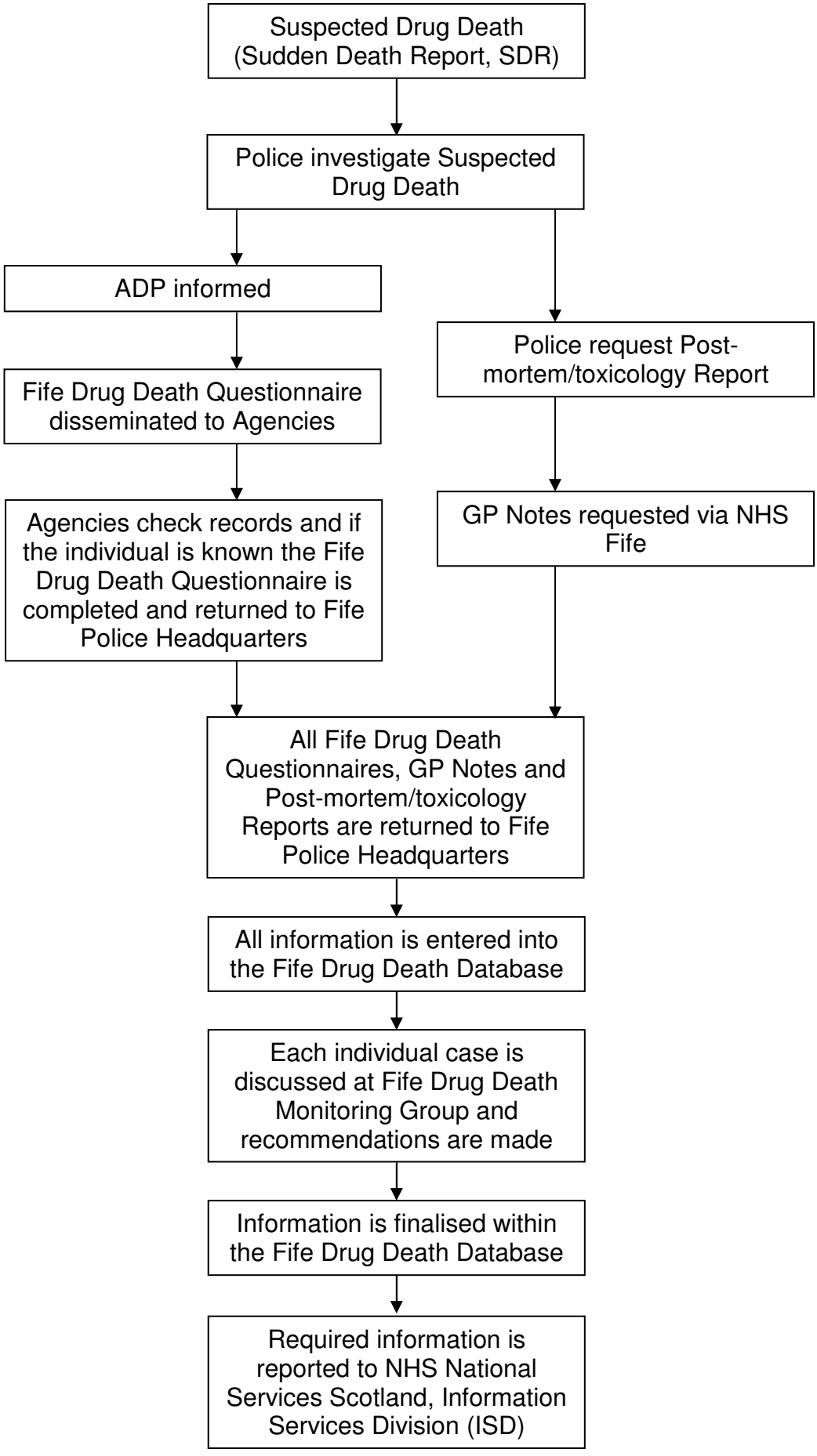
The Fife Drug Death Monitoring and Strategic Group meet and discuss each death and make recommendations. The group meet every eight weeks.

Step 7

All information is finalised in the Fife Drug Death Database.

Step 8

The Drug Death Researcher, on behalf of the Fife Drug Death Monitoring Group, reports each Drug Death, alongside all the detail required of the death to the ISD


Suspected Drug Death (Sudden Death Report, SDR)
Police investigate Suspected Drug Death
ADP informed
Police request Post-mortem/toxicology Report
Fife Drug Death Questionnaire disseminated to Agencies
GP Notes requested via NHS Fife
Agencies check records and if the individual is known the Fife Drug Death Questionnaire is completed and returned to Fife Police Headquarters
All Fife Drug Death Questionnaires, GP Notes and Post-mortem/toxicology Reports are returned to Fife Police Headquarters
All information is entered into the Fife Drug Death Database
Each individual case is discussed at Fife Drug Death Monitoring Group and recommendations are made
Information is finalised within the Fife Drug Death Database
Required information is reported to NHS National Services Scotland, Information Services Division (ISD)

1 EAST CENTRAL SCOTLAND MCN SUSPECTED DRUG DEATH QUESTIONNAIRE

Fife Drug Death Questionnaire

(Fife, Forth Valley & Tayside) (Version 1.0)

SERVICE:

PERSON COMPLETING:

CONTACT NUMBER OF PERSON COMPLETING:

DATE OF COMPLETION:

NAME OF DECEASED:

CONTENTS:

GUIDELINES FOR COMPLETION:

- Please complete this questionnaire as best as you can with the information available to you about the deceased (including any case notes, referral letters, conversations/interviews with the deceased etc.).

- It is unlikely that any one service will be able to complete all the items in the questionnaire, therefore don't worry about marking the 'unknown' option. Just

1 EAST CENTRAL SCOTLAND MCN SUSPECTED DRUG DEATH QUESTIONNAIRE

complete what you can from each section by marking your answers with an X in the left hand column (under the question number). If there is no one answer that fits your information, or you have additional information, please put this in the free text boxes at the end of the section.

- If you have very little information about the deceased, for example because you have had very little contact, or your contact concluded several years ago, please provide whatever information that you can in the final free text box (Section 7).

1 EAST CENTRAL SCOTLAND MCN SUSPECTED DRUG DEATH QUESTIONNAIRE

(Fife, Forth Valley & Tayside) (Version 1.0)

QUESTIONNAIRE INFORMATION:

- This questionnaire is used by the Drug Death Groups in Fife, Forth Valley and Tayside to better understand Drug Deaths with the aim of saving lives.

- The information reported to us via these questionnaires is collated (with information from other sources e.g. GP Notes) and distributed in an anonymised and collated annual report for each area.

- The questionnaire was designed by the East Central Scotland Managed Care Network Drug Death Sub Group. It is based on an earlier questionnaire used in Fife since 2005, which was originally designed by the Centre for Addiction Research and Education Scotland (CARES), University of Dundee. We would also like to acknowledge the Scottish Drug Enforcement Agency, National Drugs Database (2006). This questionnaire can also be used to assist in completion of the National Drug-Related Deaths Data Collection Form (NHS National Services Scotland).

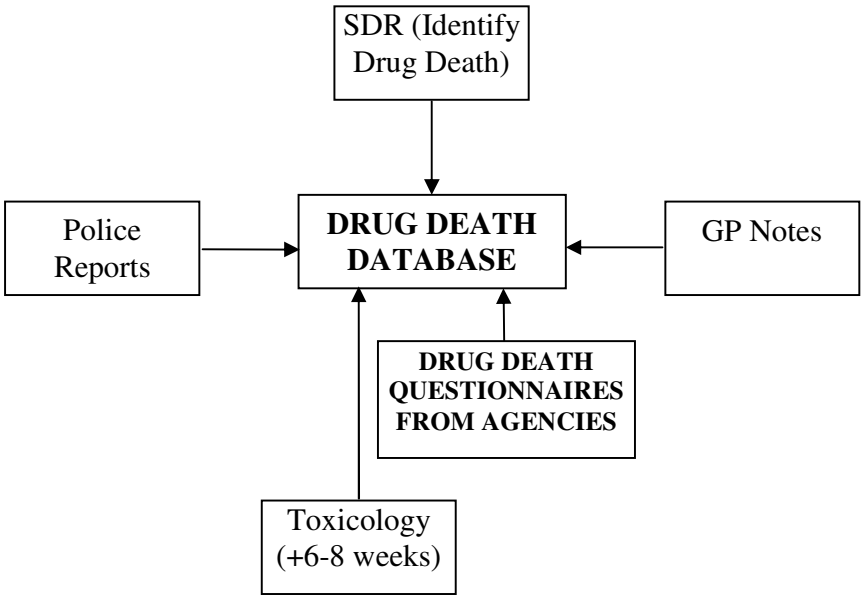
7.1 If you have any questions about this questionnaire please contact:

Dr Julia Neufeind
Drug Death Researcher
Julia.Neufeind@nhs.net
Or
Abby Stephenson
Drug Death Research Assistant
abbystephenson@nhs.net

Thank you for your cooperation and your help in providing us with this information.

Figure 1: Drug Death Database Information Input

1 EAST CENTRAL SCOTLAND MCN SUSPECTED DRUG DEATH QUESTIONNAIRE



SECTION 1: DEMOGRAPHIC CHARACTERISTICS	
1.1	Date of Birth (*day/month/year*):
1.2	Community Health Index (CHI) Number:
1.3	GP Details: (*please specify practice name and address if known*)
1.4	Gender of Deceased:
	Male
	Female
1.5	Ethnicity:
	White
	Black
	Asian
	Mixed
	Other (please specify)
	Unknown
1.6	Last Known Address:
1.6.1	Postcode:
Any Additional Comments/Information for Section 1:	

SECTION 2: LIFE CONTEXT AND SOCIAL FUNCTIONING	
Life Context at Time of Death	
2.1	What was the deceased's accommodation in the 6 months before death? *(can select more than one answer)*
	Owned private accommodation
	Rented accommodation (please specify private/council if known)
	Homeless accommodation (e.g. shelter)
	Unstable accommodation (e.g. staying on friend's couch)
	Residential rehabilitation
	Prison
	Roofless
	Other (please specify)
	Unknown
2.2	What were the deceased's living arrangements in the 6 months before death? *(can select more than one answer)*
	Living alone
	Living with spouse/partner only
	Living with spouse/partner and other family (e.g. children)
	Living with friends
	Living with parents
	Living with other relatives (please specify)
	Living with others (please specify)
	Unknown
2.3	What was the deceased's source of income in the 6 months before death? *(can select more than one answer)*
	Stable employment with a regular salary
	Unstable employment (e.g. temporary work)
	Self-employed
	State benefits (e.g. jobseekers/incapacity/disability)
	Illegal income (e.g. criminal activity, benefit fraud)
	Partner's or relatives' income
	No regular income
	Other income (please specify)
	Unknown

2.4	Was the deceased in educational/vocational training in the 6 months before death?
	Yes (please specify)
	No
	Other (please specify)
	Unknown
Relationships	
2.5	What was the deceased's relationship at the time of death?
	Married
	Co-habiting
	In a relationship (i.e. couple but not living together)
	Divorced
	Separated
	Widowed
	Single (please go to question 2.6)
	Other (please specify)
	Unknown (please go to question 2.6)
2.5.1	If the deceased was in a relationship at the time of death, is there evidence to suggest that the deceased's *partner* had a drug or alcohol problem?
	Yes (please specify)
	No
	Unknown
2.5.2	Was the deceased's *partner* prescribed an opiate substitute?
	Yes (please specify)
	No
	Unknown
2.5.3	If the deceased was in a relationship at the time of death, is there evidence to suggest that there were any difficulties in the relationship?
	Yes (please specify)
	No
	Unknown

2.6	Did the deceased have any children? *(please specify details if known)*				
	DOB/Age	Living with the deceased	Living elsewhere with relatives	Looked after and accommodated	Social Work involvement (with child)
	Unknown				
2.7	Did the deceased have any *relatives* that they were close to?				
	Yes (please specify relationship)				
	No (please go to question 2.8)				
	Unknown (please go to question 2.8)				
2.7.1	Is there evidence to suggest that the deceased's close *relatives* had a drug or alcohol problem?				
	Yes (please specify)				
	No				
	Unknown				
2.7.2	Was the deceased's close *relative(s)* prescribed an opiate substitute?				
	Yes (please specify)				
	No				
	Unknown				
2.7.3	Is there evidence to suggest that there were any difficulties in the deceased's relationship with their close *relatives*?				
	Yes (please specify)				
	No				
	Unknown				
2.8	Did the deceased have any *friends* that they were close to?				
	Yes (please specify friendship if known)				

	No (please go to question 2.9)
	Unknown (please go to question 2.9)
2.8.1	Is there evidence to suggest that the deceased's close *friend(s)* had a drug or alcohol problem?
	Yes (please specify)
	No
	Unknown
2.8.2	Was the deceased's close *friend(s)* prescribed an opiate substitute?
	Yes (please specify)
	No
	Unknown
2.8.3	Is there evidence to suggest that there were any difficulties in the deceased's relationship with their *friend(s)*?
	Yes (please specify)
	No
	Unknown
Social History	
2.9	As a child/young person, were the deceased's parents divorced/separated/deceased?
	Yes (please specify)
	No
	Unknown
2.10	Was the deceased in regular contact with parents as a child/young person?
	Yes (please specify)
	No (please specify)

	Unknown
2.11	Was the deceased's residential situation stable as a child/young person?
	Yes
	No (please specify)
	Unknown
2.12	Was the deceased's schooling situation stable as a child/young person?
	Yes
	No (please specify)
	Unknown
2.13	Were there any other adverse events of note in the deceased's childhood/adolescence?
	Yes (please specify details if known)
	No
	Unknown
2.14	At what age did the deceased leave secondary school?
	Age
	Unknown
2.15	Did the deceased leave school with qualifications?
	Yes
	No
	Unknown
2.16	What did the deceased do immediately after leaving secondary school?
	Further education
	Employment
	Vocational training/apprenticeship
	Unemployed
	Other (please specify)

	Unknown
2.17	Is there any indication of domestic abuse?
	Yes (perpetrator of domestic abuse – recent, in the six months prior to death)
	Yes (perpetrator of domestic abuse – in the past)
	Yes (suffered domestic abuse – recent, in the six months prior to death)
	Yes (suffered domestic abuse – in the past)
	No
	Unknown
2.18	Is there any indication of sexual abuse?
	Yes (perpetrator of sexual abuse – recent, in the six months prior to death)
	Yes (perpetrator of sexual abuse – in the past)
	Yes (suffered sexual abuse – recent, in the six months prior to death)
	Yes (suffered sexual abuse – in the past)
	No
	Unknown
Any Additional Comments/Information for Section 2:	

SECTION 3: CRIMINAL JUSTICE AND OFFENDING HISTORY

3.1	Does the deceased have a criminal history? (*including arrests*)
	Yes
	No (please go to section 4)
	Unknown (please go to section 4)
3.2	What is the deceased SCRO/PNC number?
	Unknown
3.3	Please specify details of the deceased's *last six* arrests/stays in police custody: *(beginning with the most recent)*

	Date (entered custody)	Date (released from custody)	Charge(s) /offence(s)	Disposal (e.g. release no charge, fine etc.)	Did deceased disclose addiction?	Was medication administered? (please specify)
3.3.1						
3.3.2						
3.3.3						
3.3.4						
3.3.5						
3.3.6						

	Unknown
3.4	Has the deceased ever been in prison?
	Yes
	No
	Unknown
3.4.1	How many times has the deceased been in prison? (*please specify dates for the last six stays below if known*)
	Unknown

3.4.2	Date(s) entered custody	Date(s) released from custody

	Unknown	
3.5	Please specify details of most recent stay in prison:	
3.5.1	Prison of release or prison of main stay if different from release	
	Unknown	
3.5.2	Charge(s)/offence(s)	
	Unknown	
3.5.3	If short stay, was the deceased entered into the short stay prisoners protocol?	
	Yes	
	No	
	Unknown	
3.5.4	Did the deceased receive over dose prevention training prior to release?	
	Yes	
	No	
	Unknown	
3.5.5	Was take home Narcan given to the deceased on release?	
	Yes	
	No	
	Unknown	
Any Additional Comments/Information for Section 3:		

SECTION 4: SUBSTANCE USE HISTORY

Drug Using and Injecting Behaviour	
4.1	At what age did the deceased begin using drugs?
	Unknown
4.2	Has the deceased ever injected?
	Yes
	No
	Unknown
4.3	At what age did the deceased begin to inject?
	Unknown
4.4	Did the deceased suffer from problematic alcohol use currently or in the past? (*can select more than one answer*)
	Yes – at the time of death
	Yes – in the past
	No (please go to question 5.5)
	Unknown (please go to question 5.5)
4.5	Has the deceased ever received treatment for problematic alcohol abuse?
	In patient detox
	Community based detox
	Pharmacotherapy
	Talk based therapy (individual/group)
	Other (please specify)
	No
	Unknown
4.6	What non-prescribed substances are you aware that the deceased used currently or in the past: (*please specify details if known*)

	Drug	Ever Used	Age Started	Current Use	Usual Route (e.g. inject, oral, smoke etc.)	Any Other Information (e.g. amounts recently used)
	Alcohol					
	Amphetamines					
	Cannabis					
	Cocaine					

	Crack Cocaine					
	Dihydrocodeine					
	Diazepam					
	Ecstasy					
	Heroin/morphine					
	Methadone					
	Temazepam					
	Other (please specify)					
	Unknown					
N.B.	For prescribed medication please see Section 5					
Drug Treatment (Current)						
4.7	Was the deceased on a waiting list for an opiate substitute?					
	Yes (please specify)					
	No					
	Unknown					
4.8	Was the deceased prescribed an opiate substitute?					
	Methadone					
	Suboxone					
	Benzodiazepine					
	Buprenorphine					
	Dihydrocodeine					
	Other (please specify)					
	No (please go to question 4.9)					
	Unknown (please go to question 4.9)					
4.8.1	What date did the treatment episode begin?					
	Unknown					
4.8.2	What date was the prescription last dispensed?					
	Unknown					
4.8.3	How many times was the prescription dispensed per week?					

	Unknown	
4.8.4	How many doses per week?	
	Unknown	
4.8.5	Was consumption supervised?	
	Yes (Daily)	
	Yes (6/7 days per week)	
	Other (please specify)	
	No	
	Unknown	
4.8.6	Did the deceased regularly miss the collection of their substitute medication? *(please specify how many times in the last month if known)*	
	Yes	
	No	
	Unknown	
4.8.7	What was the current daily dose?	
	Unknown	
Drug Testing		
4.9	How many times did the deceased have a drug test in the last 12 months?	
	Unknown	
4.9.1	Please specify date of the *most recent* drug test:	
	Unknown	
4.9.2	Please specify details of the *most recent* drug test	
	Drug Tested	Positive
	Amphetamines	
	Cannabis	
	Cocaine	
	Dihydrocodeine	
	Diazepam	
	Ecstasy	
	Heroin/morphine	

	Methadone	
	Temazepam	
	Other (please specify)	
	Unknown	
4.10	How many times was the deceased breathalysed for alcohol misuse in the last 12 months?	
	Unknown	
4.10.1	Please specify date of the deceased's last breathalyser:	
	Unknown	
4.10.2	Please specify result of the deceased's last breathalyser:	
	Unknown	
Overdose History		
4.10	Has the deceased ever overdosed?	
	Yes	
	No (please go to section 5)	
	Unknown (please go to section 5)	
4.10.1	Please specify details of the deceased's overdose history:	

	Date	Drug	Intentional	Accidental	Unknown

4.11	Has the deceased ever received over dose training?
	Yes
	No
	Unknown
Any Additional Comments/Information for Section 4:	

SECTION 5: PHYSICAL AND PSYCHOLOGICAL HEALTH

Physical Health

5.1	Was the deceased suffering from a long term physical illness currently or in the past? (*please specify details if known*)		
	Condition	Past	Current
	Cancer		
	Cardiac Condition		
	Diabetes		
	DVT		
	Epilepsy		
	Hepatitis C		
	HIV/AIDS		
	Liver Disease		
	Respiratory Condition		
	Other (please specify)		
	No		
	Unknown		
5.2	Was the deceased prescribed medication currently e.g. analgesics, anti-depressants, benzodiazepines etc? (*please specify details if known*)		
	Medication	Current Prescription	Prescribed for:
	Other (please specify)		
	Unknown		

Mental Health

5.3	Was the deceased suffering from a mental health problem currently or in the past? (*please specify details if known*)		
	Condition	Past	Current
	Anxiety		
	Bi-polar Disorder		
	Depression		
	Personality Disorder		

	Post Traumatic Stress Disorder		
	Schizophrenia		
	Schizoaffective Disorder		
	Other (please specify)		
	No		
	Unknown		
5.4	Was the deceased in contact with mental health services at the time of death?		
	Yes (please specify)		
	No		
	Unknown		
Self Harm History			
5.5	Has the deceased ever self harmed? *(exclude overdoses previously recorded)*		
	Yes		
	No (please go to question 5.6)		
	Unknown (please go to question 5.6)		
5.5.1	How many times did the deceased self harm?		
	Unknown		
5.5.2	Please specify the date of the last incidence of self harm:		
	Unknown		
Significant Events			
5.6	Have any significant events occurred in the deceased's life recently? (*In the six month prior to death*)		
	Accident (please specify details including dates if known)		
	Assault (please specify details including dates if known)		
	Bereavement (please specify details including dates if known)		

	Child custody issues (please specify)			
	Other (please specify)			
	Unknown			
5.7	Have any significant events recently occurred involving the deceased's *partner, close relative(s) or close friend(s)*?			
	Significant event	Partner	Close Relative(s)	Close Friend(s)
	Recently diagnosed physical illness			
	Recently diagnosed mental illness			
	Recent injury			
	Other (please specify)			
	Unknown			
Any Additional Comments/Information for Section 5:				

SECTION 6: SERVICE CONTACT

Please complete as much of this section as you can if the deceased had any contact with your service

6.1	Who first referred the deceased to your service?	
	Criminal Justice	
	GP	
	Mental Health	
	Self	
	Social work	
	Other (please specify)	
	Unknown	
6.2	Please specify the date(s) of referral and discharge for the past twelve months:	
	Referral Date(s)	Discharge Date(s)
6.3	Did the deceased make contact/attend the first appointment offered?	
	Yes	
	CNA	
	DNA	
	Unknown	
6.4	Was attendance at appointments mandatory?	
	Yes	
	No	
	Unknown	
6.5	Please specify the deceased's attendance at appointments:	
	Regularly attended	
	Poor attendance	
	DNA all appointments offered	
	Telephone contact	
	Other (please specify)	
	Unknown	

6.6	Please specify the content of treatment episodes:
	Unknown
6.7	Please specify the main issues addressed during your contact with the deceased:
	Treatment/support for addiction
	Harm reduction
	Needle exchange
	Mental health issues
	Housing support
	Child custody/maintenance
	Issues in deceased childhood/adolescence
	Other (please specify)
	Unknown
6.8	Please specify the main reason for discharge:
	Treatment complete
	Support no longer required
	Non-compliance
	DNA
	Other (please specify)
	Unknown
6.9	Did you refer the deceased on to any other service? *(please specify details if known)*
	Service:
	Date of Onwards Referral:
	Main reason for referring on (e.g. mandated/discharge protocol):
	No
	Unknown
6.10	Are you aware of any other services the deceased was accessing currently or had accessed in the past? (*please specify details if known*)

	Service	Past	Current
	Unknown		
6.11	Are you aware if the deceased was waiting to be seen by any other services?		
	Yes (please specify)		
	No		
	Unknown		
Any Additional Comments/Information for Section 6:			

SECTION 7: ADDITIONAL INFORMATION	
7.1	Please specify any additional/other information about the deceased in the free text box below:

8 Appendix 3. A Case Vignette of a Typical Drug Death Victim in Fife 2009

The average Drug Death victim from Fife would be a White Caucasian 34 year old male who lived in central Fife. He would have started his substance misuse at the age of 16 years; around that time he would also have left school. He would have gained employment or started an apprenticeship as a labourer. His childhood would have been disrupted; he would have had a family history of psychiatric difficulties and/or substance misuse. He may have suffered physical/sexual abuse and/or spent some time in care.

He would have proceeded to misuse a cocktail of drugs and approximately 4 years after leaving school later he would have started taking heroin. He would have started injecting at around 24 years of age. He would have maintained meaningful and close relationships with his friends and family members throughout his life. He would have had children; however, they would not have lived with him and he would have lost custody of them.

He would have been known to at least 2 services, intermittently, including his GP and criminal justice services in Fife during the 5 years prior to his death. In this time he would have been misusing several types of substances including heroin, benzodiazepines (prescribed and/ or non-prescribed), alcohol and latterly methadone. He would also have encountered at least one complex episode of a co-morbid psychiatric or physical health problem with or without instances of drugs overdose and/or self-harm. He would also have experienced other life events, such as bereavement and the loss of a close relationship. He would have criminal record and have served a prison sentence some point during his life.

In the six months before his death he would have been arrested at least once. He would have committed crimes linked to his drug use and have outstanding charges/court cases at the time of his death, for crimes such as shoplifting or driving whilst under the influence of a controlled substance. At the time of his death, he would be unemployed, living alone or living with other adults and would not have changed accommodation type during those 6 months. He would have been classed as single, but may have been in a volatile, on/off relationship at this time. He would have been close to friends and family members and so would not have been socially isolated. During this time he would have been known to GP and Fife NHS Addiction Services but would not have sought/received pharmacological treatment for his drug dependency. During this time, he would be misusing a cocktail of illicit and prescribed substances.

On the day of this death he would have purchased at least one ‘tenner’ bag of heroin alongside alcohol and benzodiazepines. He would have shared these amongst friends/ co-users and injected in the presence of them. He would have died in the presence of others and would have been believed to be sleeping and any attempts to revive him would therefore have been delayed. Any means of formal resuscitation such as CPR, if attempted at all, would have been only partially conducted. He would have died at his resident home address, or in close proximity thereof.

At post mortem his blood sample would have revealed a cocktail of depressants such as morphine, benzodiazepines, alcohol and/or methadone. His cause of death would most likely have been classed as “Adverse Effects of Heroin”.